# قناة
# Medicine Way

افضل قناة للكتب الطبية في الوطن العربي

EDICINE WAY

**تيم عمل**

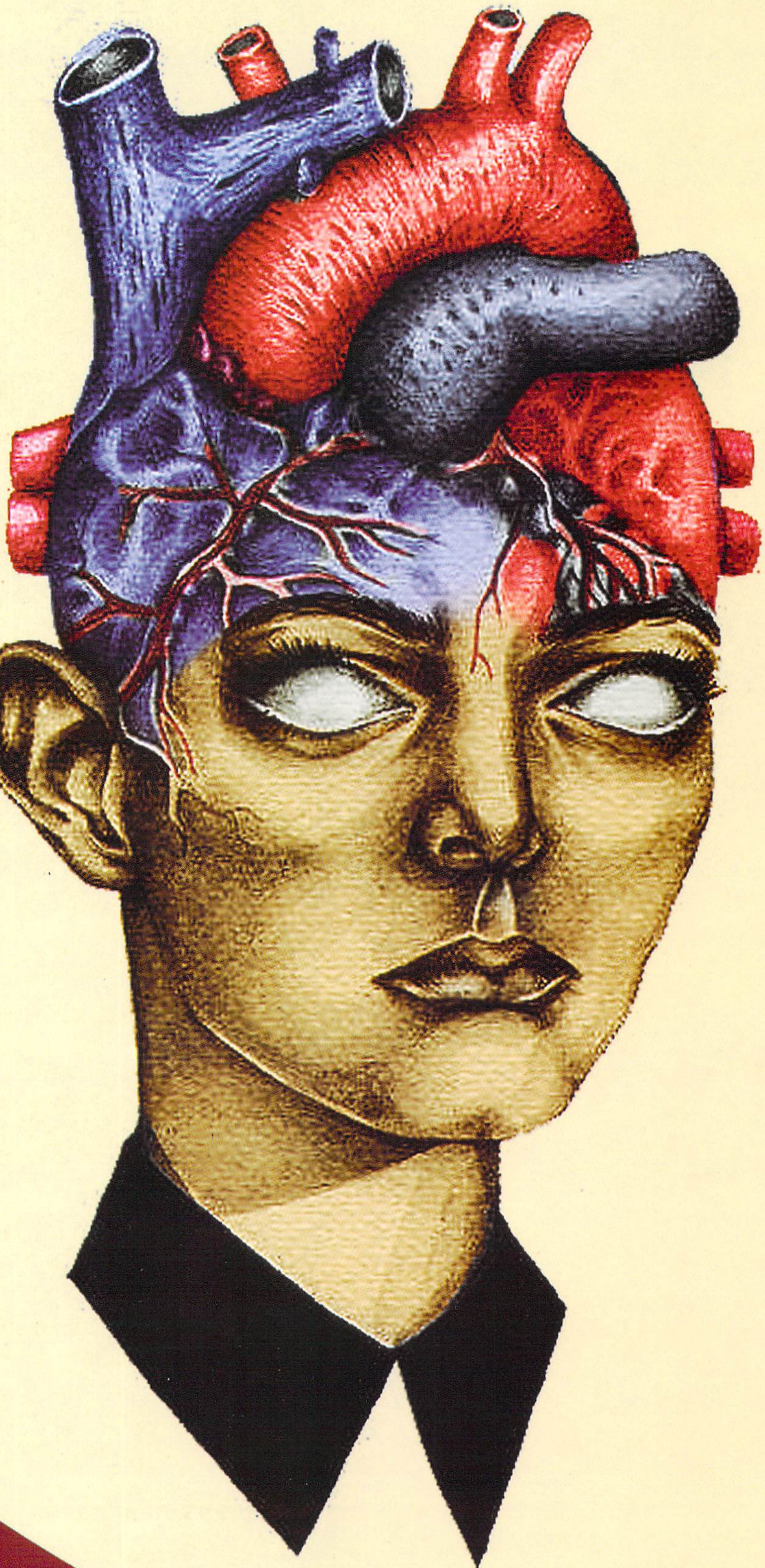
طريق الطب

**من**

منصور الجزار

**هدفنا طبيب افضل**

# SEWILAM'S CLINICAL MEDICINE



NEW EDITION

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# Sewilam's Clinical Medicine

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**Second Edition**

All thanks to **Allah** and special thanks for all those people who are always encouraging me to do more than my best and who have never stopped believing in me,

❖ **Thanks for:**

- **My father,** I know that you had to work so hard for us,
  and I appreciate it.
  Thank you for everything that you've done for me.
  I can't imagine what my life would have been without you in it.
  I'll love you forever.
- **My mother:**
  for all the times I didn't thank you either
  because I was too young or too busy or just didn't find the words,
  today I thank you for all you have done for me. Now I'm older, I realize more and more everything you did, everything you gave, and most important, everything you stand for.
  I love you and thank you with all of my grateful heart.
- **My brothers;**
- **Mohammed & Ahmed:** I appreciate all your hard work. You helped me when I really needed. I wouldn't have been able to get through that time without your help. Thanks.
- **My little beautiful sister, Reman:** You hear my pain when everyone else goes deaf, you always make smile when I think I can't, you listen to my secrets and make them yours, you give me a hug when I can't find my voice, you wipe away the tears when the world makes me weep, you mean to me more than you'll ever know, you're my best friend, you're my guardian angel.
- **My friends,** I love you all, and special thanks for :
- **Mohamed Hassan:** Some people pass through this world and leave it just as they found it.
  But people like you take the time to do special things for the world & others.
  Thanks for being present in my life, all the time & all the way.
- **Afaf Nasser:** Memories of the times I've shared with you are the happiest, yet most painful of all. You are my motivation, you are my inspiration, and without your efforts this book would have never seen the light.
- **Mohammed Anany:** Thanks for the attracting design.
- **Yahya Alnajjar:** Thanks for the Photographing.
- **My students:** you should always do more than your best, be yourself, be the change that you want. Don't let anyone break you, you are the future so make it always full of whatever you want.
- **For her!**
  I did not meet you yet, but I would like to tell you that I love you so much!
  You are the only one who deserves my feelings, time, effort and everything I have, that's for you! Finally I dedicate you my success.

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# GENERAL HISTORY

## ❖ General History is composed of 5 main parts :

## A. Personal History

1. **Name (الاسم ثلاثي) : اسم حضرتك اي**
- To be familiar with the patient & to gain confidence.

2. **Age : عندك كام سنة ؟**
- Young age : congenital
- Old age : atherosclerosis

❖ Personal history:

✓ NAS OMMRHH ناس أمرا

✓ Write personal History in a single paragraph.

3. **Sex:**
- Females : SLE , Myxoedema
- Males : COPD , Coronary heart disease

4. **Occupation : بتشتغل اي ؟ ولو بطل شغل , بطلت ليه ؟**
- Glass workers : silicosis
- Dusty workers : pneumoconiosis

5. **Marital status: متزوج ؟ متزوج من امتى ؟ عندك أولاد ؟ كام ولد ؟ أصغرهم عنده كام سنة ؟**
- Single, married, divorced, widow (widower)
- Duration , Number of children & age of the youngest

6. **Menstrual history if female patient :**
   - Menarche or menopause اول مرة جتلك الدورة امتى , لو الدورة قاطعة : اسأل عن وسائل منع الحمل بس
   - Last menstrual period : آخر مرة جتلك الدورة امتى
   - Regular or not الدور منتظمة ولا لأ
   - Time of period & length بتيجي كل اد ايه ؟ وبتكون معاكي كام يوم ؟
   - Amount : How many pads she changes per day ( بتغيري كام فوطة) ؟ كميتها اد اي
   - Lactation : Breast feeding or not ؟ رضعتي ولادك طبيعي
   - Contraception : which method & for how long ? استخدمتي وسائل لمنع الحمل وايه ولمدة اد اي ؟

   ✍ **Example : her menarche was at age of 12 years. It is regular every 28 day , lasting for 5 days of average amount. she was breastfeeding , with no history of usage of contraception**

7. **Residence & address : ساكن فين ؟ مولد وعايش طول عمرك هناك ؟**
- Born in …. & lives in …
- Endemic areas for parasitic diseases.

8. **Habits of medical importance:**
- **Smoking : بتدخن ؟ كام سيجارة في اليوم ؟ من كام سنة ؟ بطلت ؟ امتى ؟ وليه ؟**
  - Type, number of cigarettes/day, duration
  - Smoking index = Cigarettes/day X duration in years
  - Mild smoker < 100
  - Moderate smoker : 100 – 400
  - Heavy smoker > 400
- **Others: Shisha, Alcohol, cannabis (hashish), morphine, heroin, drugs.**
  **بتشرب خمرة أو مخدرات ؟ بطريقة منتظمة ولا في المناسبات ؟**

9. **Handedness : بتكتب بايدك اليمين ولا الشمال ؟**
- To determine dominant hemisphere in neurological cases.
- If dominant hemisphere is affected, aphasia occurs.
- For more details , see neurological sheet.

✍ **Example of personal History:**

- Male patient , Zeyad Saeed Soliman, 55 years old, doctor, married and has 2 children, the youngest is 4 years old, was born and lives in Cairo, he is cigarette smoker, he smokes 20 cigarettes/day for 20 years & he is right handed.

## B. Complaint + duration: إي اللي جابك المستشفى ؟

- ❖ As short as possible.
- ❖ No medical terms , in patient own words e.g.

| | |
|---|---|
| • Abdominal distension **not** ascites | • Shortness of breath **not** dyspnea |
| • Awareness of heart beat **not** palpitation | • Swelling of both lower limbs **not** edema of lower limbs |

- ❖ E.g.: the patient is complaining of shortening of breathing of 1 week duration

## C. History of present illness = HPI المرض بدأ معاك إزاي , آخر مرة كنت كويس فيها إمتى ؟

1. Use medical terms , Long
2. Special analysis : according to every sheet
3. General analysis of complaint (OCD ↑↓ SIT):

- ○ **O**nset: acute, gradual, insidious ؟ التعب ده لاحظته ازاي , ظهر فجأة ولا بالتدريج
- ○ **C**ourse: progressive, regressive, stationary, remission & exacerbation
  التعب بيقل ولا بيزيد ولا بيحدث في صورة نوبات ولا زي ما هو
- ○ **D**uration ؟ التعب ده بقاله أد اي
- ○ Associated **S**ymptoms by leading questions هل مع التعب كان فيه اي اعراض تانية
- ○ What increases ↑ & what decreases ↓ في حاجه بتزوده أو في حاجه بتقلله
- ○ Related **I**nvestigation؟ أشعات أو تحاليل
- ○ Related **T**reatment (medical or surgical) & it's effect
- ○ روحت مستشفى , اخدت ادوية وتأثير العلاج اي بتقل الأعراض ولا لسه زي ما هي , عملت عمليات ؟

4. Review for other systems

- ❖ HPI :
- ✓ Analysis the complaint
- ✓ Positive data in chronological order
- ✓ Negative data are mentioned as well, related then non related.

## D. Past history (DODs) ; events before onset of HPI:

1. **D**iseases:

- ○ Coronary heart disease , rheumatic fever , tonsillitis
- ○ Tuberculosis.؟ جالك زمان كحة ودم وبلغم ؟ كنت بتسخن بليل وتبل الملايه عرق ؟ اتحجزت في مستشفى الصدر وأخدت علاج لفترة طويلة
- ○ DM, ؟ عندك سكر ؟ , من امتى ؟ اخدت علاج ايه , جرعته اد اي ؟ آخر تحليل سكر كان كام ؟ حصل اي مضاعفات
- ○ Hypertension ؟ عندك ضغط ؟ من امتى ؟ اخدت علاج ايه , جرعته اد اي ؟ آخر مرة قيست الضغط كان كام ؟ حصل اي مضاعفات
- → (some schools of clinical medicine prefer to mention them in HPI; the patient known to be … diabetic or hypertensive)
- ○ Hepatitis ؟ لون عينك اصفر ؟ لون البول اتغير ؟ رحت الحميات
- ○ Bilharziasis جالك بلهارسيا قبل كده ؟ نزلت الترعة قبل كده وجالك دم في البول أو البراز؟ لو نعم كمل أسئلة
  - الحكاية ديه من امتى ؟ اخدت علاج اي ؟ جرعته اد اي ؟ حللولك بعدها وقالولك خفيت ولا لأ ؟ نزلت الترعة بعد كده ؟

2. **O**perations & blood transfusion: عملت عملية قبل كده ؟ عملية اي ؟ من امتى؟ حصل بعدها مضاعفات أو تلوث في الجرح ؟ اتنقلك دم ؟

- ❖ N.B.:
  - ▪ If the operation is before onset of HPI, mention it with past history.
  - ▪ If the operation is after onset of HPI, mention it with HPI.
  - ✍ The patient was operated upon … years ago, for … "name of operation" in …, complicated by … or not complicated

3. **D**rug intake: type & duration & **D**rug allergy.؟ بتاخد ادوية بصفة مستمرة ؟ عندك حساسية من اي دوا
4. **S**imilar attacks ؟ هل جت لك الحالة ديه قبل كده & Trauma ؟ عملت حوادث قبل كده

## E. Family history:

1. Similar condition in family حد في العائلة اشتكى بنفس الشكوى
2. Positive consanguinity ؟ الأب والأم قرايب
3. Common diseases : DM , HTN , TB ؟ في حد في العائلة عنده ضغط او سكر او درن (سُل)

- ➢ In negative cases → irrelevant FH "of no clinical significance"

# GENERAL EXAMINATION

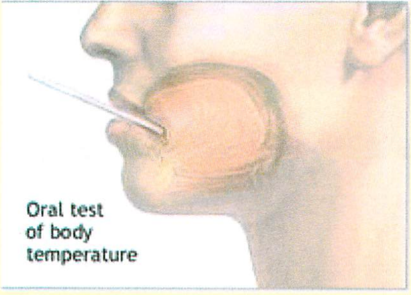
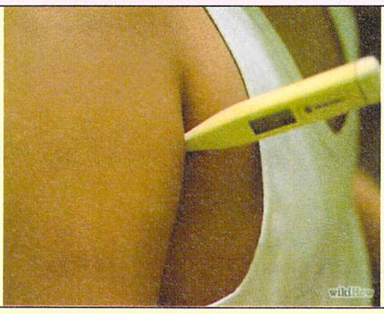
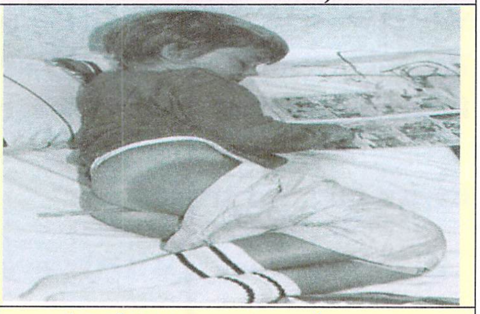
| I. Vital signs | II. General overview ( A, B, C, D, E) | III. Systemic overview |
|---|---|---|
| 1. Temperature | A. Appearance | 1) Head & neck |
| 2. Pulse | B. Built | 2) Upper limb |
| 3. Blood pressure | C. Consciousness / Color | 3) Lower limb |
| 4. Respiratory movements | D. Decubitus | 4) Other systems except that of local examination. |
| | E. Facial Expression | |

# I. Vital signs

## 1. Temperature

❖ **Measurement :**

1. **Sterilize the thermometer in 70% alcohol for at least 20 minutes**
2. **Shake the mercury down to 35 °C using a snapping wrist motion then put it in …. for at least 3 minutes:**

| ○ The mouth (under the tongue with closed lip) | ○ Axilla | ○ Rectum (3-4 inches in the anal canal) |
|---|---|---|
|  |  |  |
| ○ **Normal oral temperature :**<br>▪ **36.5 – 37.2 °c** | ○ **Axillary temperature:**<br>▪ **Add 0.5 °c** | ○ **Anal temperature (core temperature ) :**<br>▪ **Subtract 0.5 °c**<br>▪ **Patient lie on one side with hip flexed**<br>▪ **Lubricate the thermometer** |

❖ **N.B.:**

- **°F (Fahrenheit) = (°C x 9/5) + 32**
- **Normal diurnal variation < 1 °C : lowest in the early morning reaching peak in afternoon then decreases again, this is due to heat regulating center in the brain**

❖ **What is Pulse: temperature ratio?**

▪ **Every rise of body temp by 1 °C ↑ pulse by 10-15 beats due to the effect of temperature which causes more steep rapid diastolic depolarization of action potential of SAN.**

❖ **What are the Causes of Higher pulse rate ( more than 15 bpm) for pyrexia "relative tachycardia" ?**

- **Carditis (rheumatic, infective, diphtheritic)**

❖ **What are the Causes of Slower pulse rate for a given pyrexia (less than 10 bpm) "relative bradycardia" ?**

- **Typhoid fever , Viral infection , Meningitis**
- **Ascending cholangitis in obstructive jaundice "Charcot's fever"**

❖ **What are the indications to measure the temperature per anus = what are the conditions you cannot measure the temperature orally?**

| | |
|---|---|
| A. Child, Convulsion, Coma | B. Dyspnea & mouth breather |
| C. Difficulty : painful mouth disease(ulcers) , insane, trismus of jaw, severe vomiting | |

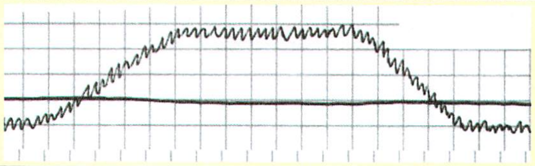
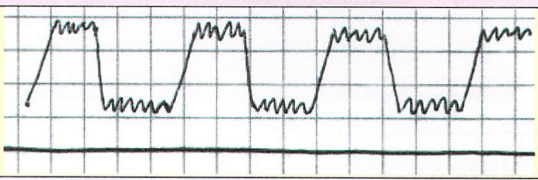
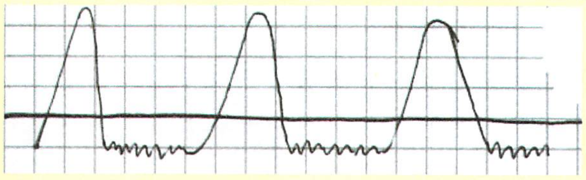
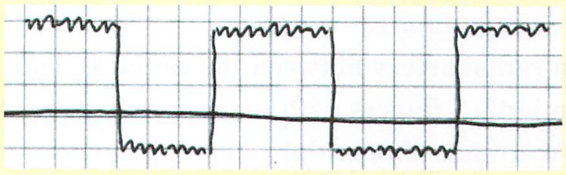
❖ **What are the grades of fever ?**

| • Grade | 1. Low grade fever | 2. High- grade fever | 3. Hyperpyrexia |
|---|---|---|---|
| • Range | ○ From 37.2 to 38.5 °C | ○ From 38.6 to 40.5 °C | ○ ≥ 40.6 °C |
| • Causes | ○ Malignancy<br>○ Infection | | ○ Heat stroke, Pontine Hemorrhage<br>○ Encephalitis, Status Epilepticus<br>○ Thyrotoxic crisis |

## ❖ What is meant by hypothermia & what are the causes ?

- **Hypothermia : ≤ 35 °C**
- **Causes: (AAP, Mahmoud Sewilam)**
  - Old Age, damage of Anterior hypothalamus, Phenothiazine, Myxedema, Starvation & Shock.

## ❖ What are types of fever?

| 1. Continuous | 2. Remittent |
|---|---|
|  |  |
| 3. Intermittent or hectic | 4. Relapsing or cyclic |
|  |  |

| • Type | 1. Continuous | 2. Remittent | 3. Intermittent or hectic | 4. Relapsing or cyclic |
|---|---|---|---|---|
| • Description | ○ Temperature is always high & daily fluctuations less than 1 °C | ○ Temperature is always high & daily fluctuations more than 1 °C | ○ Temperature falls to normal level once or more during the day | ○ Short days of fever intercepted by short days of normal temperature. |
| • Example | ○ Typhoid<br>○ Pneumonia | ○ Empyema<br>○ Pus under tension | ○ Benign tertian malaria | ○ Brucellosis, Hodgkin's disease |

## ❖ What are the causes of fever (pyrexia) of unknown origin (FUO = PUO) ?

- **Definition :** an illness lasting more than 3 weeks with temperature above 38.3 °C in which diagnosis has not been made despite a good hospital evaluation.
- **Causes :**

| | |
|---|---|
| **1. Infectious:**<br>• **Abscesses :** hepatic, splenic & perinephric<br>• **Protozoal :** malaria, amoebic liver abscess & toxoplasmosis<br>• **Bacterial :** SBE, typhoid, brucellosis, pneumonia & pyelonephritis<br>• **Viral :** IMN, CMV, AIDS & Hepatitis<br>• **Granuloma :** TB & fungal | **2. Non infectious inflammation:**<br>• **Collagen diseases:** RF, FA, SLE, PAN<br>• **Granuloma :** sarcoidosis, Crohn's disease<br>• **Tissue injury:** pulmonary emboli |
| **3. Drug fever :** sulphonamides, penicillins & barbiturates | **4. Psychogenic fever:** factitious fever |
| **5. Neoplastic diseases:**<br>• **Blood malignancies :** lymphoma & leukemia<br>• **Solid malignancies :** Cancer kidney, liver, pancreas, GIT & lung. | **6. Miscellaneous:**<br>• FMF, thyroiditis & hemolysis |

## ❖ What is the difference between fever & hyperthermia?

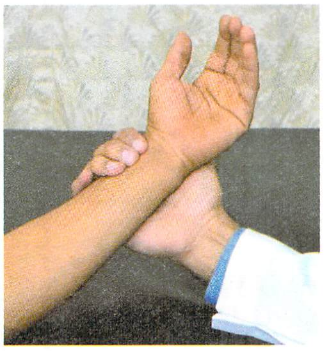
| ❖ Fever | ❖ Hyperthermia |
|---|---|
| ❖ Pathogenesis: | |
| ○ Raised thermostat set-point<br>○ Elevated levels of PGE2 in the hypothalamus is the trigger for raising thermostat set-point → stimulate vasomotor center → periphral vasoconstriction → ↓ heat loss from the skin (cold sensation) → ↑ raise core-body temperature 1 or 2 °C | ○ Normal thermostat set-point<br>○ Due to<br>▪ Exogenous heat exposure (heat stroke) or<br>▪ Endogenous heat production (thyrotoxic crisis) or<br>▪ Drugs (atropine, succinyle choline, malignant neuroleptic syndrome) |
| ❖ Treatment: | |
| ○ Antipyretics give good response | ○ Physical measures (not antipyretics) |

# 2. Pulse

❖ Comment on the following: (RR-VV-SEP), others.

- **R**ate, **R**hythm
- **V**olume, Condition of the **V**essel wall
- **S**pecial character, **E**quality on both sides in pulse volume, **P**eripheral pulsations

## 1. Rate :



- **Count it** in 1 minute.
- **Site:** in radial artery between the radial styloid & tendon of flexor carpi radials using middle 3 fingers with semi-pronated hand to avoid stretch of brachial artery by fascia in cubital fossa.
- **Normal rate** : 60-100 b/m
- **Bradycardia :** < 60 b/m
- **Tachycardia:** > 100 b/m

❖ **What are the causes of :**

| | Bradycardia | Tachycardia |
|---|---|---|
| • Rate | ▪ < 60 b/m | ▪ > 100 b/m |
| • Physiological | ▪ Athletes, deep sleep | ▪ Emotional & mental stress |
| • Pathological | ▪ Obstructive jaundice<br>▪ Hypothyroidism | ▪ Hypovolemia<br>▪ Hyperthyroidism |
| • Pharmacological | ▪ ß-Blockers, Ca-channel blocker, digitalis | ▪ Adrenaline , atropine |

## 2. Rhythm :

- **Normal :** regular
- **Abnormally: Irregular :**
  - Tachycardia or bradycardia with variable AV block
  - **AF;** atrial fibrillation
  - Multiple premature beats = **extrasystole**

❖ **How to differentiate between A.F. & extrasystole ?**

| | AF | Extrasystole |
|---|---|---|
| • Rate | ▪ Rapid 120 - 150 / min.<br>▪ Rare slow AF<br>❖ **Causes of slow AF:**<br>○ Drugs : Digitalis or B-blockers<br>○ Lone AF<br>○ Associated heart block | ▪ Normal |
| • Rhythm | ▪ Marked irregularity (can't count 4 regular beats) (irregular irregularity) | ▪ Occasional irregularity (can count 4 regular beats) (regular irregularity) |
| • Pulsus deficit | ▪ > 10 / min. | ▪ < 10 / min. |
| ❖ **Pulsus deficit:** done in **irregular** pulse | | |
| • **Definition :** apical pulse rate (as detected by counting S1 by stethoscope) > radial pulse | | |
| • **Cause :** ventricular contraction opening cusps without peripheral transmission of blood | | |
| • 1st sound | ▪ Variable | ▪ Normal with occasional irregularity |
| • JVP | ▪ Absent a wave | ▪ Normal with occasional irregularity |
| • Exercise | ▪ ↑ Irregularity | ▪ ↓ irregularity |
| • ECG | ▪ Absent a wave - irregular QRS | ▪ Early QRS complex followed by compensatory pause |

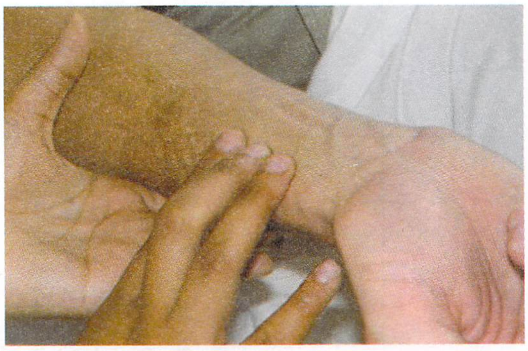
## 3. Volume = amplitude = pulse pressure (PP) = degree of expansion:

- **Normally** pulse pressure = (Systolic – Diastolic ) = 120 – 80 = 40 mmHg
  - Average range : 30 → 60 mmHg i.e. average volume

- **Abnormally : small volume, big volume, variable volume .**

| ❖ Causes of small volume (weak pulse) = narrow PP = low CO ❖ < 30 mmHg | ❖ Causes of big volume (wide PP) = prominent arterial pulsation = causes of hyperdynamic circulation ❖ > 60 mmHg | ❖ Causes of variable volume |
|---|---|---|
| • **↓ Filling :**<br>○ Pericardial effusion<br>○ Constrictive pericarditis | • AR<br>• Atherosclerosis,<br>• Anemia,<br>• AV fistulae | • Arrhythmia:<br>○ AF<br>○ Multiple extrasystoles |
| • **↓ Pumping:**<br>○ Myocardial infarction<br>○ Heart failure<br>○ Shock | • Beri Beri.<br>• Block of heart, bradycardia.<br>• Paget disease, pregnancy, ↑BP (systemic hypertension) | • Variable partial heart block |
| • **Obstruction:**<br>○ AS, MS.<br>○ Pulmonary hypertension | • Thyrotoxicosis | • Pulsus alternans |

## 4. Condition of the vessel wall :

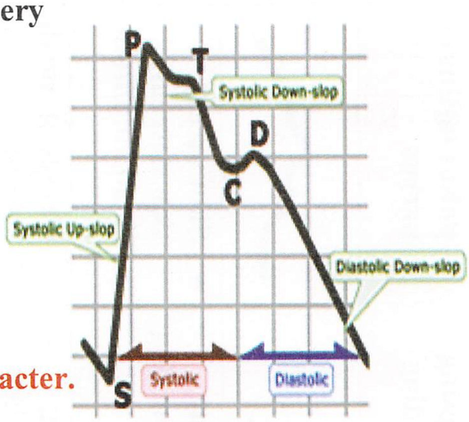


- **Normally:** not felt
- **Abnormally:** felt
  - ○ Thickened (cord like) in focal arteriosclerosis **“Monckeberg sclerosis”**
  - ○ Beaded in **polyarteritis nodosa**
- **Technique: by Rolling technique: Using 3 finger:**

♥ استخدم ثلاث اصابع , الاصبعين الطرفيين لمنع الدم والاصبع الأوسط يعمل Rolling

1. Place the tip of three fingers (ring, middle, index) over the radial artery
2. Press proximally using the index finger to close the radial artery
3. Press by the ring finger distally to prevent the back flow
4. Palpate the vessel wall by the middle finger

## 5. Special character :



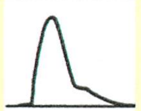
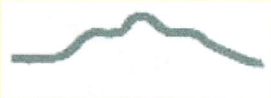
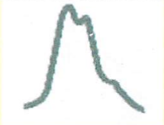
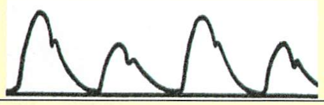
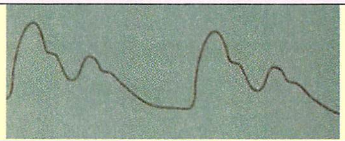
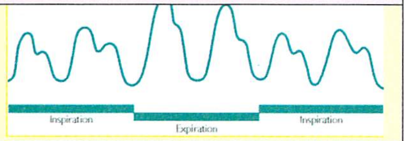
❖ **Normally:**

○ **Normal pulse : gradual ascent & gradual descent i.e. no special character.**

❖ **The normal pulse :**

1. **S (starting point):** starting point of arterial pulse-wave. Aortic valve opens and the blood of the left ventricle is discharged.
2. **P (percussion wave):** wave caused from LV ejection that increase the arterial wall linearly.
3. **T (tidal wave):** reflected wave from the small artery.
4. **C (incisura) :** end-point of systolic phase, then aortic valve is closed.
5. **D (dicrotic wave):** reflective oscillatory wave occurred from the blood crash into aortic valve by blood pressure of aorta.

❖ **Abnormally : see the table :**

| • **Special character** | 1. **Water hammer pulse = collapsing pulse = bounding pulse** | 2. **Plateau pulse = pulsus tardus et parvus** | 3. **Pulsus Bisferiens** | 4. **Pulsus alternans** | 5. **Pulsus bigeminus or trigeminus = extrasystoles** | 6. **Pulsus paradoxus** |
|---|---|---|---|---|---|---|
| • **Picture** |  |  |  |  |  |  |
| • **Definition** | • **Sudden ascent, sudden descent, big amplitude** | • **Slow ascent, slow descent, small amplitude** | • **Pulse with 2 palpable systolic peaks** | • **A strong beat followed by a weak beat with equidistance** | • **A strong beat followed by a weak beat then a pause** | • **↓ pulse volume with deep inspiration due to ↓ systolic BP more than 10 mmHg** |
| • **Causes** | ○ **Causes of big volume especially AR** | ○ **Causes of small volume especially AS** | ○ **Double aortic lesion (AR + AS)**<br>○ **Idiopathic hypertrophic subaortic stenosis** | ○ **Left ventricular failure** | ○ **Digitalis toxicity**<br>○ **Hypokalemia**<br>○ **Myocardial infarction** | ○ **Cardiac tamponade : pericardial effusion & constrictive pericarditis**<br>○ **Obstructive lung disease : COPD, status asthmaticus** |

| ❖ **Why is the name "water hammer" ?** | ❖ **How to detect water hammer pulse?** |
|---|---|
| • **It is a popular toy in the 19th century formed of evacuated glass bottle half filled with water, when held in the hand and suddenly inverted, it delivers short hard knock.** | ♥ ايدك الشمال تمسك ايد العيان , واليمين تحوط ذراع المريض , هتحس خبطات قويه<br>• **Best elicited by raising patient arm high (to ↓ diastole) while palpating forearm by palm.** |

❖ **What is the mechanism of pulsus alternans?**

- **Alternating strong (healthy& diseased) & weak (healthy only) regular beats due to prolonged recovery time of damaged myocardium because of heterogeneousity of refractoriness of the failed myocardium**

❖ **How to detect pulsus alternans?**

- **By palpating the pulse.**
- **By sphygmomanometer.Measuring BP by elevation of the cuff pressure above systolic BP then very gradual release of pressure till feeling the pulse , at this pressure hold the cuff inflation and count the pulse , then remove the cuff and recount the pulse, if it's doubled so pulsus alternans is diagnosed**

❖ **How to detect pulsus paradoxus ?**

- **It is misnomer because it is an exaggeration of the normal pattern and not a paradox**
- **In normal subjects, during inspiration, the lungs expand & accommodate more amount of blood, thus there will be a normal ↓ SBP ( less than 10 mmHg ) & ↓ pulse volume.**
- **In abnormal subjects : e.g. pericardial effusion during inspiration, there will be an exaggerated ↓ SBP (more than 10 mmHg) an exaggerated ↓ in pulse volume**
- **It can be detected by palpation of the arterial pulse or by detecting ↓ SBP more than 10 mmHg during inspiration using a sphygmomanometer.**

❖ **What are the special characters of pulse associated with aortic valve disease?**

| | | |
|---|---|---|
| • **AR: water hammer pulse** | • **AS: Plateau pulse** | **AR + AS : Pulsus Bisferiens** |

## 6. Equality on both sides of pulse volume :

- Both radial arteries should be palpated at the same time

| ❖ Causes of unequal pulse volume: | ❖ Causes of unequal carotid pulsations: |
|---|---|
| • In the Lumen: thrombosis, embolism<br>• In the Wall:<br>o Aneurysm of aortic arch<br>o Dissecting aneurysm of aorta<br>o Arteritis<br>o Atypical coarctation of aorta involving left subclavian<br>• Outside the wall: cervical rib, pancost tumor | • Aneurysm of aortic arch<br>• Dissecting aneurysm of aorta<br>• Atheroma of innominate artery or the common carotid |

## 7. Peripheral pulsations on BOTH sides:

| A. Head & Neck | B. Upper Limb | C. Lower Limbs |
|---|---|---|
| 1. Superficial temporal artery :<br>o anterior & superior to the tragus<br>2. Facial artery :<br>o Infront of anterior border of masseter<br>3. Common & external carotid artery:<br>o At the middle 1/3 of anterior border of sternomastoid, then press against carotid tubercle which is the anterior tubercle of transverse process of C6<br>o By thumb or tips of index & middle fingers<br>o NEVER to feel both side at the same time.<br>❖ N.B. : internal carotid artery is felt in the tonsillar fossa. | 1. Radial artery:<br>o Between the radial styloid & tendon of flexor carpi radials using middle 3 fingers with semi-pronated hand to avoid stretch of brachial artery by fascia in cubital fossa<br>2. Brachial artery :<br>o Upper part: felt by pressing along the medial border of biceps muscle<br>o Lower part: Flex the elbow, using the thumb, felt by pressing along the medial border of biceps tendon<br>3. Axillary artery:<br>o Put 2 thumb on the deltoid muscle & all fingers backwards to feel the pulse | 1. Dorsalis pedis artery :<br>o First metatarsal space, just lateral to tendon extensor hallucis longus<br>❖ N.B.:<br>o May be absent as normal variant in 15%<br>o If dorsalis pedis pulse is felt , you must examine pulsation in posterior tibial artery as dorsalis pedis is the continuation of anterior tibial artery not the posterior .<br>2. Posterior tibial artery :<br>o Felt midway between medial malleolus & tendo-achilhis<br>3. Popliteal artery: at popliteal fossa:<br>o Upper part: the patient lie on his face (prone) with the knee flexed, feel the pulse against the popliteal surface of the femur<br>o Lower part: The patient lying on the back(supine) , flex the knee at right angle & use the 2 thumbs on tibial tuberosity & press all other fingers against the popliteal surface of the tibia<br>4. Femoral artery :<br>o Put thigh in flexion with abduction & external rotation, a point just below inguinal ligament midway between ASIS & symphysis pubis (mid inguinal point) |

❖ What are the causes of absent or decreased peripheral pulsation?

| | | |
|---|---|---|
| • Leriche's syndrome :<br>o Claudication of the buttocks and thighs<br>o Absent or decreased femoral pulses<br>o Impotence | • Coarctation of aorta<br>• Extensive atherosclerosis | • Peripheral embolism<br>• Thromboangitis obliterans "Burger's disease" |

## 8. others :

- **Force** → systolic BP : least pressure needed to occlude arterial pulsation, it's a rough estimation of SBP
- **Tension** → diastolic BP : least pressure needed to feel arterial pulsation, it's a rough estimation of DBP
- **Radiofemoral delay:** femoral artery is weaker & delayed when compared with radial pulse simultaneously in coarctation of aorta.

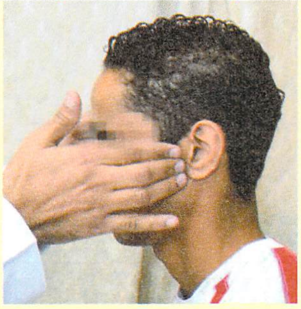
❖ **Example of full comment on the normal pulse:**

- The patient's pulse is regular, 75b/m, average volume, equal in both sides , no special character , vessel wall not felt , with intact peripheral pulsations & no radio-femoral delay

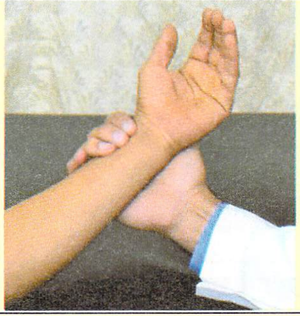
❖ **Example of full comment on pulse in case of AF:**

- The patient's pulse is irregular, 75b/m, variable volume, pulsus deficit > 10, equal in both sides , no special character , vessel wall not felt , with intact peripheral pulsations & no radio-femoral delay

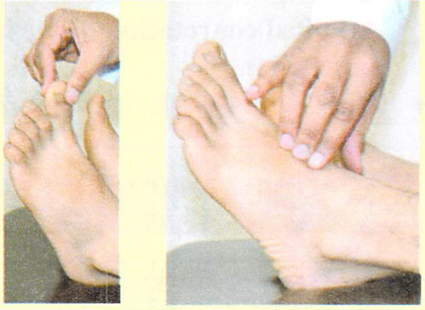
**Superficial temporal artery**



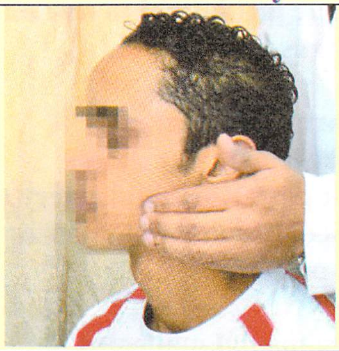
**Radial artery:**



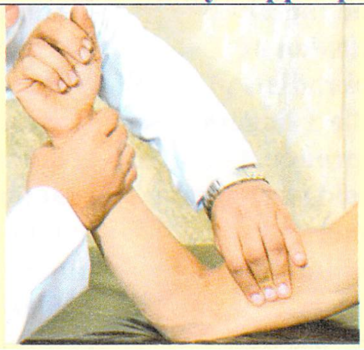
**Dorsalis pedis artery :**



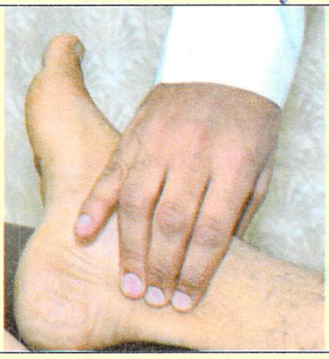
**Facial artery :**



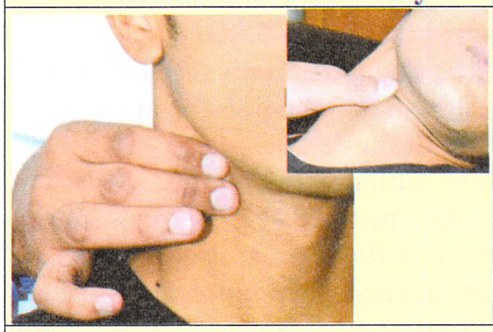
**Brachial artery : upper part**



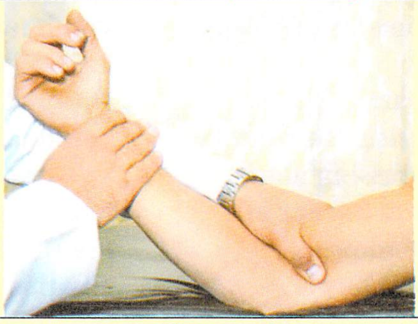
**Posterior tibial artery :**



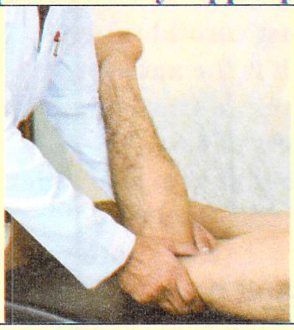
**External carotid artery**



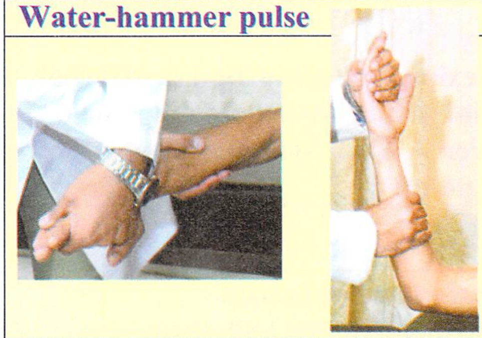
**Brachial artery : lower part**



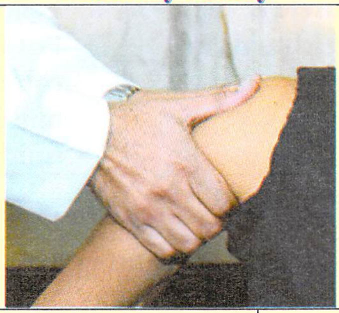
**Popliteal artery: upper part**



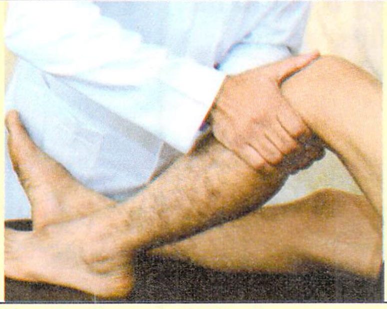
**Water-hammer pulse**



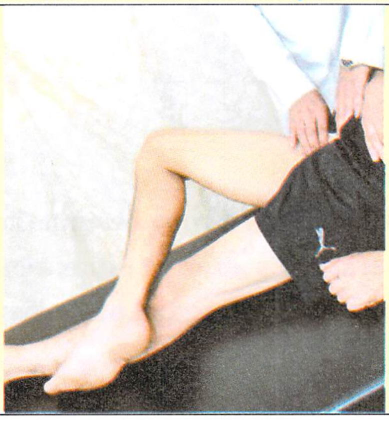
**Axillary artery**



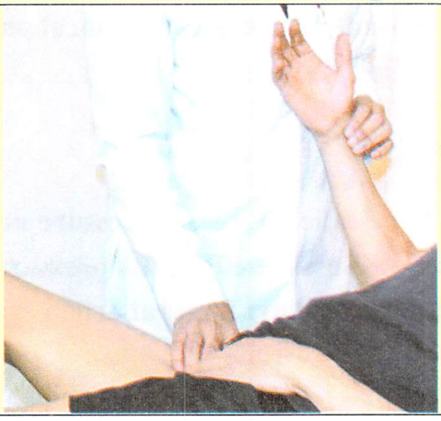
**Popliteal artery: lower part**



**Femoral artery :**



**Radio-femoral timing :**



## 3. Blood Pressure

### ❖ Definition :

- **Systolic BP:** *pressure exerted on the arterial wall* by **blood ejected from LV contraction.**
- **Diastolic BP:** *pressure exerted on the arterial wall* as a result of **elastic recoil of aorta.**

### ❖ Values :

❖ Normal range : $\frac{Systolic\ from\ 90\ to\ 140\ mmHG}{Diastolic\ from\ 60\ to\ 90\ mmHg}$

| Category | Systolic BP | Diastolic BP |
|---|---|---|
| • Optimal | < 120 | <80 |
| • Normal | < 130 | < 85 |
| • High normal | 130-139 | 85-89 |
| **Hypertension** | | |
| • Mild (stage 1) | 140 - 159 | 90 -99 |
| • Moderate (Stage 2) | 160 - 179 | 100 -109 |
| • Severe (Stage 3) | ≥ 180 | ≥ 110 |
| **Isolated systolic hypertension** | | |
| • Grade I | 140 - 159 | < 90 |
| • Grade II | ≥ 160 | < 90 |

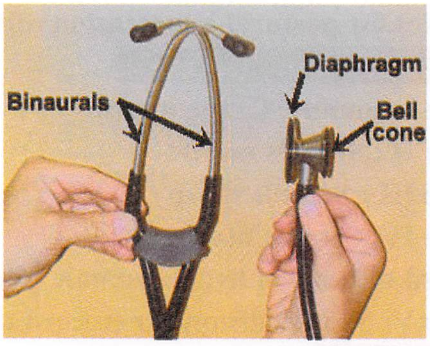
### ❖ Types of sphygmomanometer :

- **Mercurial :** the oldest and the most accurate
- **Aneroid :** without fluid "pneumatic"
- **Electronic:** the most recent & least accurate

1225 826
120
80
80 60
START

### ❖ What are the uses of Sphygmomanometer?

1. **Record BP + staging of hypertension**
2. **Detect pulsus** alternans
3. **Detect pulsus** paradoxus
4. Trousseau **sign** : elicit carpopedal spasm in latent tetany
5. Lowenberg's cuff **sign** : elicit pain in DVT
6. Hess **test** : elicit ↑ capillary fragility in purpura
7. Walker's **test** : elicit ptosis in myasthenia gravies
8. **Therapeutic :**
   - **Closed venesection** : in acute HF, hypertensive encephalopathy
   - **Secure hemostasis**



### ❖ Measurement:

| A. Palpatory method: | B. Auscultatory method : |
|---|---|
| • Used for **systolic BP only**<br>• To avoid auscultatory gap (silent interval between systolic and diastolic pressure)<br>• Less accurate<br>• Method : see below. | • Used for **systolic & diastolic BP**<br>• Method : see below. |

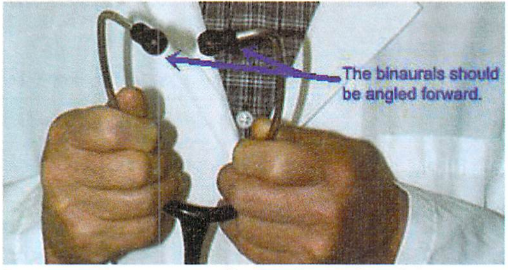
### ❖ What is auscultatory gap & how to avoid ?

➢ **Auscultatory gap = silent gap:**

- **Definition :** period during recording blood pressure by auscultation in which no sounds can be heard but blood passes & can be felt
- **Present in** some hypertensive patients & **mechanism** is unknown
- **Importance of it** : as it may leading to false measurement of systole & diastole
- **How to avoid :**
  - ○ Do **Palpatory** method at first to know roughly systolic BP
  - ○ **Rise pressure** in the bag 20 – 30 mmHg above systolic blood pressure known by palpation
  - ○ Do **Auscultatory** method

## ❖ Precaution before BP measurement:

1. Patient should **rest** for 5 -10 min before measurement
2. Arm should be at **level of heart** e.g. resting on pillow
3. Arm should be **supported** to avoid isometric exercise which ↑ BP
4. **Avoid venous congestion** from tight clothing or incomplete deflation from previous measurement
5. **Proper size of bag:**
    - Width of bag should be 40 % of limb circumference
    - Length of bag should be 80 % of limb circumference
    - Using normal cuff in obese gives false diagnosis of hypertension



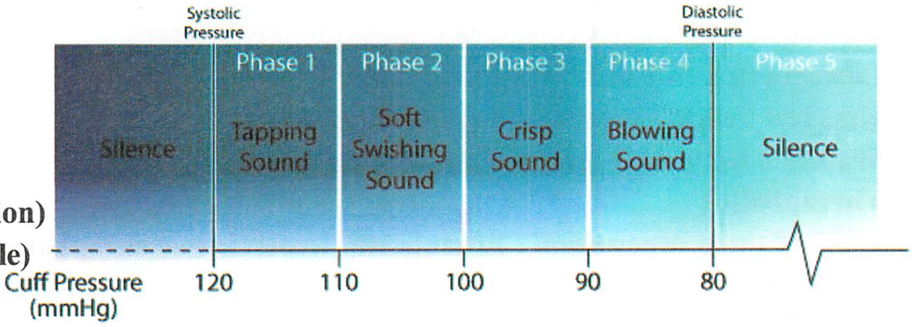
6. Be aware of the **auscultatory gap**
7. Wrap the cuff with the inflatable inner bladder (rubber bag) **centered** over the area of the brachial artery

## ❖ Technique of blood pressure measurement :

1. Precautions must be done
2. Palpate the brachial artery and then wrap the cuff snugly around the patient's arm with the middle of bladder over the brachial artery pulsation
   ( 3-5 cm above cubital fossa, medial to the biceps tendon )
3. Inflate the cuff while palpating the radial pulse
   (to avoid the auscultatory gap) until it's no longer palpable, note the reading **(Palpatory method)**
4. Deflate the cuff and wait 15-30 seconds before re-inflating
5. Re-inflate steadily with the diaphragm of stethoscope over the brachial artery to a pressure 20-30 mmHg above the level previously determined by palpation
6. Deflate the cuff slowly (2 mm / sec. to avoid error), listening for Korotoff sounds as they appear (systolic) and then disappear (diastolic) **(Auscultatory method)**
7. BP is measured in **supine position** and then ask the patient to **stand** and re-measure blood pressure after 1 -2 minutes for postural hypotension (difference of systolic BP between both ≥ 20mmHg)

## ❖ Korotkoff sounds (phases) :

1. **Phase I:** sounds start to appear
2. **Phase II :** Sounds muffle
3. **Phase III :** Sounds sharp
4. **Phase IV:** Sounds muffle
   (record diastole in hyperdynamic circulation)
5. **Phase V:** Sounds disappear (record diastole)



## ❖ Special notes:

1. **BP should be taken in Right & Left arms:**

○ Normally may be a difference in pressure of 5 -10 mm Hg, subsequent reading should be made on arm with higher pressure.

➢ **If difference between both arms > 15mmHg → same causes of unequal pulse.**

2. **BP in LL is measured by:**

- Application of special **large** cuff around **lower 1/3 of thigh** & auscultation of **popliteal** artery (in popliteal fossa) while patient lies in **prone** position.

3. **Normally systolic BP of LL is more than UL by 10-20 mmHg due to :**

| | | |
|---|---|---|
| • Arteries of LL "femoral" in direct continuity with aorta | • LL muscles are more bulky | • Effect of gravity |

4. **Indication to measure the BP from LL :**

**A. To diagnose LL ischemia**

**B. In aortic regurge:**

- Systolic BP in LL is > than UL by 60 mmHg (**exaggerated normal criteria - Hill's sign**)

**C. In coarctation of aorta:**

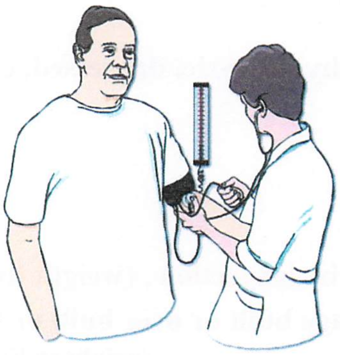
- Systolic LL BP is < than LL (**opposite normal criteria - reversed Hill's sign**)

**5. If Volume "Pulse Pressure" is > 60 mmHg , diastolic BP < 60 mmHg then :**

- Diagnose AR & search for its peripheral sign (e.g. Pistol shot)
- Large pulse volume & water hammer pulse
- Epigastric pulsation coming from aorta

**6. Blood pressure measurement in obese patient**

- by using large sized cuff but if not available we can measure BP by inflating the cuff around the forearm and auscultate radial artery



**7. Hypotension :**

- It's decline of systolic blood pressure < 90-100 mmHg (supine hypotension)

❖ **Causes :**

- Heart failure, Hypovolemia
- Stenotic lesions, Drugs : diuretics, nitrates, B blockers
- Addison's disease
- Orthostatic hypotension

**8. Orthostatic hypotension "postural hypotension" & it's measurement.**

❖ **Orthostatic challenge or the tilt test :**

❖ قياس الضغط في نفس الوقت وبنفس الجهاز وبنفس لفة ال cuff مرة والعيان نايم ومرة وهو واقف

A. Measure the blood pressure in supine position and then ask the patient to stand and re-measure blood pressure after 1 -2 minutes

B. 1-2 minute after standing, about 7-8 ml/kg of blood shift to the lower body → ↓ COP, also increase of circulating catecholamines and systemic vascular resistance occur

| C. Normally : | D. Orthostatic hypotension means: |
|---|---|
| • Pulse rate is increased by about 10 /m & stabilizes after 45 seconds | • Pulse rate is increased at least 30/minute |
| • Systolic blood pressure increase by 3-5 mmHg & stabilizes within 1-2 minutes | • Systolic blood pressure decreased by ≥ 20 mmHg or |
| • Diastolic blood pressure increase by 3-8 mmHg & stabilizes within 1-2 minutes | • Diastolic blood pressure decreased by ≥ 10 mmHg |

E. **Causes of Orthostatic hypotension:**

- Antihypertensive drugs e.g. ganglion blocker,
- Autonomic neuropathy e.g. DM
- Addison's disease
- Lumbar sympathectomy
- Prolonged recumbency, Elderly patient

## 4. Respiratory movements

| | 1. Rate | 2. Rhythm | 3. Depth | 4. Type of breathing |
|---|---|---|---|---|
| ▪ Normal | • 12 – 20 /min (pulse : respiration ratio = 4 : 1) → Count respiratory rate while you are simulating counting the pulse rate to distract the attention of the patient. | • Regular | • Full expansion of the chest wall with full relaxation i.e. average | • Females : thoraco-abdominal<br>• Males : abdmino-thoracic |
| ▪ Abnormally | ▪ For more details : see chest chapter | | | |

# II. General overview (A, B, C, D, E)

❖ Appearance, Built & height, Consciousness, Colours, Decubitus & facial Expression.

## 1. Appearance

- Healthy, ill, toxic, depressed, elation, anxious, irritable … etc.

## 2. Built & height

1. Built by inspection , (weight by weighing scale)

- Average built or over built or Under built
- Body mass index : $\frac{\text{weight in Kg}}{(\text{height in m})^2}$
  - ☞ Causes of obesity & underweight: see later in endocrinology chapter.

| Category | Body mass index = BMI |
|---|---|
| ▪ Underweight; malnutrition | Below 18.5 |
| ▪ Average normal weight | 18.5 – 25 |
| ▪ Overweight | 25 – 30 |
| ❖ Classification of obesity : | |
| ▪ Class I : Mild obesity | 30 – 35 |
| ▪ Class II: Moderate obesity | 35 – 40 |
| ▪ Class III : Marked (Morbid) obesity | > 40 |

2. Height :

- Average or giant or dwarf

A. The height and span are equal (proportionate ):

- The height : distance from occiput to heel in upright position
- Span : the distance between the tip of middle fingers with outstretched hands

B. Lower and upper segment are usually equal :

- Lower segment : distance from symphysis pubis to the floor
- Upper segment : distance from the occiput to the symphysis pubis

☞ Causes of gigantism "tall stature" & dwarfism "stunted growth = short stature": see later in endocrinology chapter.

## 3. Consciousness

❖ For more details : see neurology chapter

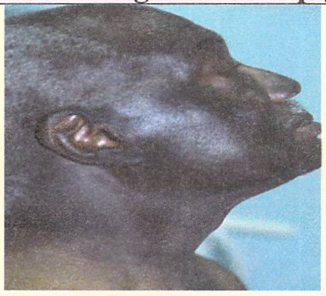
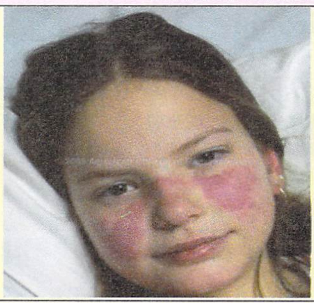
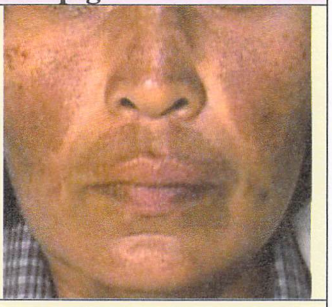
- Patient is conscious cooperative , well oriented to time, place & person, average memory, mentality ( intelligence) mood (affect)
- Conscious (mentality) is affected in :
  - Neurological & psychiatric casas
  - Major organ failure :

| | | |
|---|---|---|
| ▪ Respiratory failure ($CO_2$ narcosis) | ▪ Hepatic encephalopathy | ▪ Uremic encephalopathy |

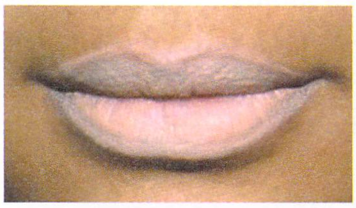
## 4. Colours = Complexion

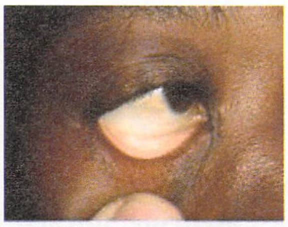
| | | |
|---|---|---|
| A. Pigmentation | B. Pallor | C. Sclera " yellow & blue" |
| D. Cyanosis | E. Rash & vascular lesions | |

## A. Pigmentation:

| ❖ Causes of generalized pigmentation | ❖ Causes of localized pigmentation |
|---|---|
|  |   |
| 1. Familial & racial<br>2. Primary Addison's diseases<br>3. Primary biliary cirrhosis<br>4. Pituitary Cushing disease<br>5. Pellagra<br>6. Neurofibromatosis<br>7. Hemochromatosis<br>8. *D*M<br>9. *S*kin diseases<br>10. *L*eprosy | • As butterfly area of the face : butterfly rash:<br>A. Red :<br>• Malar rash : MS with PH (reflex VD or compression of sympathetic chain)<br>• Cushing syndrome ,Myxedema , alcoholics , normal variant<br>• Discoid rash : SLE<br>B. Brown :<br>• Pellagra<br>• Chloasma gravidarum : in pregnancy |

## B. Pallor :





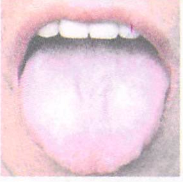
1. Definition : decrease visibility of oxyhemoglobin
2. Detected in:

A. Mucous membrane:

- Inner side of lips (slightly pull the lower lip outward & look for the colour inside)
- Conjunctiva : but not in Egypt because of endemic trachoma which produces whitish membrane in eyelid.

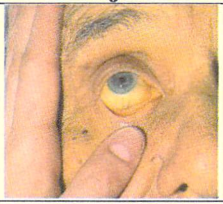
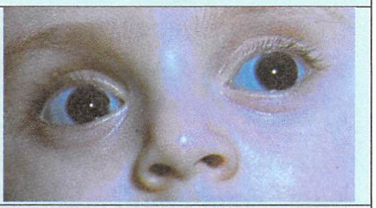
B. Tongue (more accurate)

C. Palmer crease of hand, nail



3. Causes:
   1. Decrease blood flow to superficial vessels : low CO, shock, syncope, HF, toxemia (SBE)
   2. Anemia
   3. Edema (mask color of melanin & HB) : nephrotic syndrome
   4. Others: myxedema, lymphedema, albinism

## C. Sclera "Yellow & Blue"

| Yellow: jaundice | Blue : |
|---|---|
|  |  |
| ▪ Yellowish discoloration of skin & mm due to total bilirubin more than 3 mg % i.e. manifest jaundice<br>▪ Subclinical jaundice : 1-3 mg%<br>▪ Normally total bilirubin : 0.2 - 1 mg % | ▪ Thin sclera showing choroidal pigment beneath |
| ❖ Deposited in:<br>○ Sclera: because sclera is rich in elastin & elastin has high affinity to bilirubin & sclera is white.<br>→ Examined in lower fornix of the eye; asking the patient to look upwards and facing the day light (as yellow light lamps may produce artificial jaundice)<br>○ Soft palate | ❖ Causes :<br>○ Normal variant<br>○ Congenital glaucoma "Buphthalmos"<br>○ Osteogenesis imperfecta<br>○ TB |

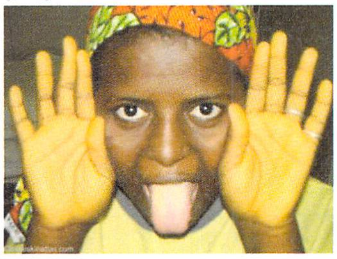
❖ **What are the types of Jaundice?**

| | Hemolytic Jaundice | Obstructive jaundice | Hepatocellular |
|---|---|---|---|
| Cause | Excess hemolysis of RBCs → ↑ hemobilirubin | Obstruction of bile ducts → ↑ cholebilirubin | Hepatitis, cirrhosis → ↑ both hemobilirubin & cholebilirubin |
| Sclera | Lemon yellow jaundice | Olive green jaundice | Orange yellow jaundice |
| Stool | Dark stool | Pale stool | Pale stool |
| Urine | Normal urine colour which darkens in standing (acholuric jaundice) | Dark urine | Dark urine |
| Others | Pallor, leg ulcers, ↑ liver & spleen | Biliary pain , pruritus & bradycardia | Clinical picture of liver cell failure |

❖ **What are the differential diagnoses of jaundice?**

a) **Normal yellow sclera :** in Negroes (Negros normally cyano-icterus)

b) **Hypercarotenemia**



- **Causes :**
  - Increase intake of carotene in vegetables
  - DM
  - Vitamin A deficiency
  - Myxedema, liver cell failure
- **Sites :** It appears in palm, soles & face, but not in the sclera and mucous membranes

c) **Xanthomatosis:** see later.

d) **Chronic Renal Failure :** retention of yellow pigments (urochromogen) superimposed on pallor of anemia (dirty yellow)

e) **Drugs :** atebrine, miracil-D, picric acid toxicity

## D. Cyanosis :

Normal reduced HB:
2.1-2.4 gm /dl

❖ **Definition:** bluish discoloration of skin & mucous membrane (mm)

❖ **Etiology :**
- ↑ level of reduced HB in capillaries > 5 gm /dl or abnormal HB in capillaries

❖ **N.B. :**
- Cyanosis never occurs in severe anemia : incompatible with life
- Cyanosis appears easily in: polycythemia

❖ **Types of cyanosis:**

1. **Chemical cyanosis: "false cyanosis"**

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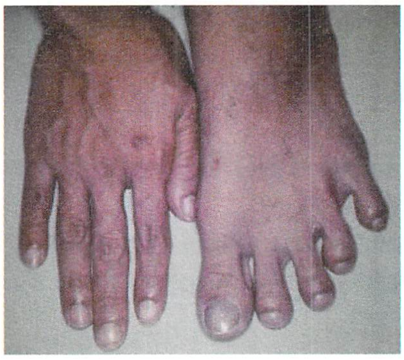
- **Definition :**Abnormal HB simulates reduced HB
- **Clinically:** simulate central cyanosis
- **Causes:**
  - Met-hemoglobinemia (nitrite treatment )
  - Sulf-hemoglobinemia (sulfonamide treatment)
- **Diagnosed by:** spectroscopy

2. **Differential cyanosis**



- **Definition :**Cyanosis in LL only (absent in UL)
- **Causes :**
  - PDA with pulmonary hypertension (Eisenmenger PDA)
  - PDA with preductal (infantile) aortic cortication

| | 3. Central Cyanosis = Hypoxic Hypoxia | 4. Peripheral Cyanosis = Stagnant hypoxia |
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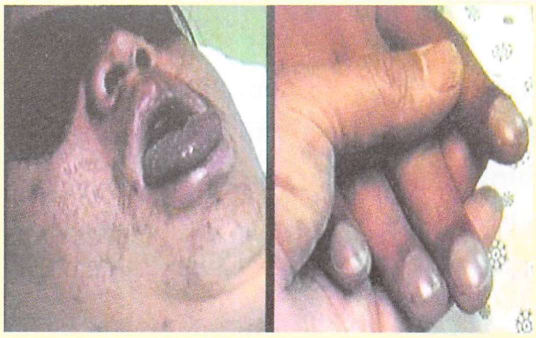
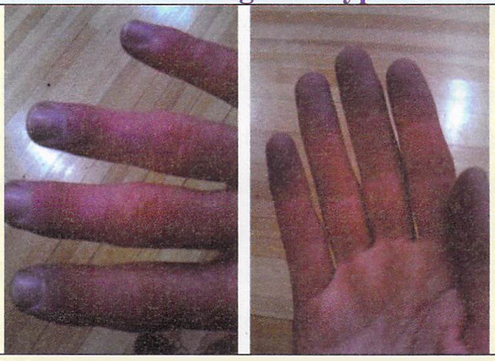
| |  |  |
| 1. Definition | • Blood pumped in aorta contains more than 5 gm % reduced HB | • Stagnation of blood in peripheral circulation leads to extraction of more O2 |
| 2. Causes | • Cardiogenic acute pulmonary edema & Polycythemia | |
| | • Congenital Heart disease with right to left shunts: Eisenmenger's, F3, F4<br>• Chest : COPD, IPF, pulmonary embolism<br>• Asphyxia, high Altitude<br>• Opening of Pulmonary A-V shunts : liver cirrhosis & failure | • Low Cardiac output : shock<br>• Congestive heart failure<br>• Cold exposure<br>• Arterial & venous diseases : Raynaud's & thrombosis |
| 3. Site | • Tongue (under surface ± upper S.)<br>• Generalized : inner aspect of lips, tips of fingers, toes, nose & lobule of ear | • Generalized : inner aspect of lips, tips of fingers, toes, nose & lobule of ear *NOT in the tongue* |
| 4. Hand | • Warm due to hypoxia (VD) | • Cold due to peripheral VC |
| 5. Warming | • No effect | • Cyanosis improves |
| 6. Clubbing | • Present (blue clubbing) | • absent |
| 7. O2 Saturation | • Low < 80% | • Normal (95 - 98%) |
| 8. O2 TTT | • If lung disease : improves cyanosis<br>• If congenital HD : no effect | • No effect |

❖ Why are lips not preferred as a site for cyanosis?

- Smokers : blue lips
- Negros normally cyano-icteric tinge

❖ Which part of the tongue do you look at for cyanosis ?

- You look at undersurface from forwards
  - ? Why?
    - Undersurface : as papillae coating the upper surface
    - Forwards : as the veins posteriorly

❖ What are the causes of combined central & peripheral cyanosis ?

☞ Cardiogenic acute pulmonary edema & Polycythemia

❖ How to unmask peripheral cyanosis in a patient with combined central & peripheral cyanosis ?

☞ The patient with peripheral cyanosis has cold hands so warming hands unmasks it.

❖ Why doesn't peripheral cyanosis affect the tongue?

- Because peripheral cyanosis is caused by blood stagnation which can't occur in the tongue being:
  - Active mobile organ → VD
  - Warm oral cavity → VD
  - Devoid of vasoconstrictor sympathetic supply (No autonomic fibers)
  - Well perfused as double blood supply of the tongue

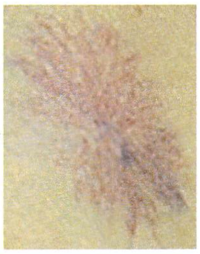
❖ When does not central cyanosis appear in tongue?

- In cases of differential cyanosis

❖ When does peripheral cyanosis appear in tongue?

- SVC obstruction
- Lingual vein thrombosis : localized cyanosis in the tongue

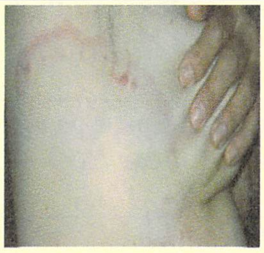
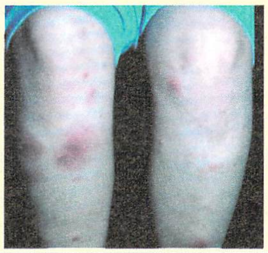
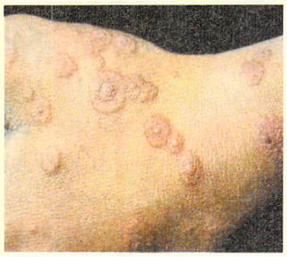
## E. Vascular lesions & rashes :



1. **Spider naevi:**

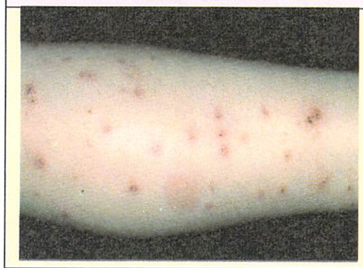
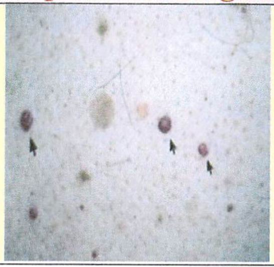
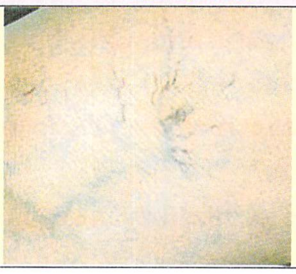
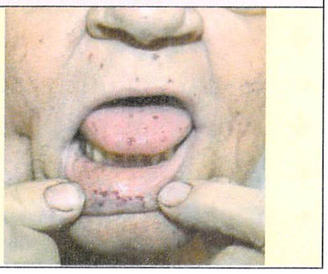
- They consist of central dilated arteriole with radiating capillaries resembling spider's legs.
- Mechanism : unknown but 2 theories : excess estrogen theory & vasodilator materials theory
- Compression of the central arteriole, causes blanching of the whole lesion,
- Releasing of the pressure , the blood refill the leg's of spider
- They are found in the distribution of the SVC (face, neck, UL & upper chest above the nipple line)
- Size : variable (from pinhead to about 0.5 cm )
- Non-specific ; Causes : may be found in normal people, pregnancy ,thyrotoxicosis & LCF, vitamin B12 deficiency
- Confirmed by :
  - Pin – head test: Central pressure = blanching دوس عليها بسن القلم على مركزها ← الأرجل هتختفي
  - Glass Slide test = pulsations ← دوس عليها بشريحة زجاجية

2. **Erythema:**

| A. Erythema marginatum | B. Erythema nodosum | C. Erythema multiforme |
|---|---|---|
|  |  |  |
| • Painless non tender red spots over the trunk & proximal extremities with serpiginous margin<br>• In Rheumatic fever (major criteria) | • Painful red indurated nodules on the chin of tibia, thighs, knees, extensor surface of arms & forearms<br>• Caused by:<br>○ Primary TB<br>○ Sulfonamides, Streptococcal infection, Sarcoidosis | • Red ring with central vesicle or hyperpigmented known as Target iris lesion<br>• Painful if there is mucous membrane involvement<br>• Caused by :<br>○ Sulfonamides, HSV<br>○ Mycoplasma pneumonia |

❖ Others : = **Differential diagnosis of spider nevi :**

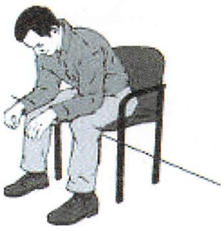
| | Level | Pruritus | Effect of Pressure | Pulsating | Site |
|---|---|---|---|---|---|
| • Spider naevi | Raised | Not | Fading | Pulsate | SVC distribution |
| 3. Insect bite | Raised | Itchy | Fading | Not | Exposed areas |
| 4. Purpura | Not | Not | Not fade | Not | Common in LL & lower abdomen |
| 5. Campbell de Morgan spots = Cherry (senile) angioma | Raised | Not | Not fade | Not | Trunk & extremities |
| 6. Venous star | Variable | ± | Increased تزداد وضوحاً | Not | LL |
| 7. Hereditary hemorrhagic telangiectasia (HHT) = (Osler–Weber–Rendu syndrome) | Raised | Not | Fading | ± | • Skin<br>• On mucous membrane e.g. lips & tongue<br>• Organs |

| • Insect bite | • Campbell de Morgan spots | • Venous star | • HHT |
|---|---|---|---|
|  |  |  |  |

## 5. Decubitus

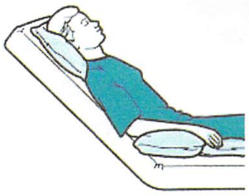
- ❖ **Normal : no special decubiti; the patient is lying comfortable in bed**
- ❖ **Abnormally :**

1. **Sitting up : Bronchiectasis, massive ascites**
2. **Prayer position: the patient prefers to lean forward :**



   - ○ **Posture of drainage in bronchiectasis, pericardial effusion, aortic aneurysm & acute pancreatitis**

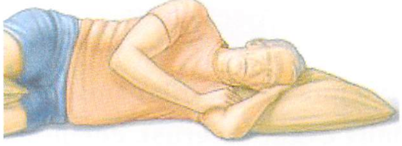
3. **Orthopnea: dyspnea on lying flat improves on semisitting, using high pillows**



   - ○ **Causes: Left side heart failure, MS, pregnancy, tense ascites & status asthmatics, severe emphysema.**
   - ○ **N.B. : orthopnea is not pathognomonic to left side heart failure.**

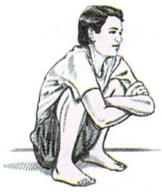
4. **Platypnea : dyspnea in the erect position relived by lying flat e.g. in hepato-renal syndrome**

5. **Trepopnea (Lateral decubitus) : patient prefers to lie on one side**



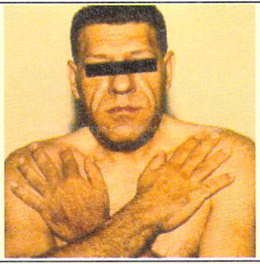
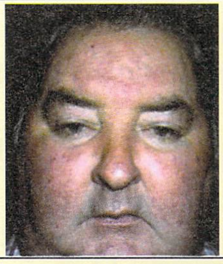
   - ○ **On the affected side : pleurisy , lung abscess (postural drainage)**
   - ○ **On healthy side in lung collapse**

6. **Squatting position : in Fallot's tetralogy**



## 6. Facial Expression

- ❖ **Facial expression of patient : normal (don't mention it) or**
- ❖ **Abnormally :**

| | |
|---|---|
|  |  |
| ○ **Acromegaly :**<br>**Ape face : coarse features, enlarged ears, nose, lips, tongue** | ▪ **Cushing syndrome :**<br>**Moon face, erythema (plethoric cheeks) with acne, hirsutism (moustache)** |

- ○ **Chronic illness: Emaciated; wasted temporalis.**
- ☞ **Other facial expression, in each chapter with the related cases.**

# III. Systemic overview

## 1. Head:

### A. Head

| | |
|---|---|
| 1. **Skull** e.g. shape e.g. acromegaly : square shape | 2. **Hair** e.g. silky hair in LCF or sparse hair in myxedema |

### B. Eye :

| | |
|---|---|
| 1. **Hair loss in** outer 1/3 in myxedema & leprosy<br>2. **Xanthelasma** is a yellowish eruption at the inner side of the eyelids & periorbital skin associated with hypercholesterolemia.<br>3. **Exophthalmos in** thyrotoxicosis, cavernous sinus thrombosis , orbital tumor. | 4. **Eye lid :**<br>○ **Retraction :** thyrotoxicosis<br>○ **Ptosis** (unilateral or bilateral) : see neurology.<br>○ **Pupil:** see neurology<br>○ **Puffiness of eye lid:** see discussion<br>○ **Eye movement :** see neurology |
| 5. **Sclera :** jaundice | 6. **Lens :** sublaxation in Marfan's syndrome |

### C. Nose :

| | |
|---|---|
| 1. **Size :** enlarged in acromegaly, myxedema<br>2. **Redness of** the in SLE<br>3. **Sulphur granules** in riboflavin deficiency | 4. **Working ala nasi** in respiratory failure<br>5. **Nasolabial fold** obliterated in facial palsy |

### D. Butterfly area = local pigmentation :

- ○ **Red or Brown :** causes : see before .
- ○ **Petichae :** in SBE , differentiated from :
- - Spider naevi in liver cell Failure : fade on pressure
- - Insect bite "flea" : itchy, generalized

### E. The mouth :

1. **Angular stomatitis** in iron deficiency anemia & ariboflavinosis (↓Vitamin B2)
2. **Lips :** pallor , cyanosis ( Negros normally cyano-icterus), chielosis (dry cracked in Ariboflavinosis)
3. **Teeth :** separation of the lower teeth may occur in acromegaly , loosing of teeth in DM
4. **Tongue :**

| | | |
|---|---|---|
| a) Size | • Large: acromegaly, myxedema, cretinism | • Small ( LMNL) |
| b) Color | • Pale in anemia , blue in central cyanosis, slate colored in Addison disease, brown in smoking, black with iron therapy | |
| c) Papillae | • Atrophy (red glazed tongue): in iron deficiency anemia, B12 deficiency , pellagra, liver cirrhosis, DM & anticancerous drugs. | • Enlargement (strawberry tongue): in scarlet fever |
| d) Surface | • Dry tongue : in mouth breathers, dehydration<br>• Coated tongue as in typhoid fever | |
| e) Movement: Fasciculations, tremors , power, deviation : see neurology. | | |

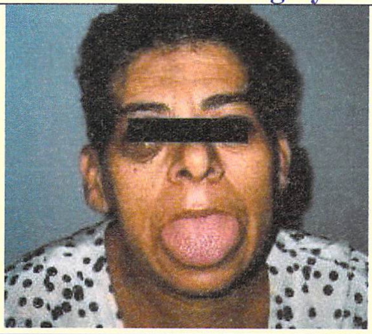
5. **Buccal mucosa :** pigmentation in Addison's disease
6. **Palate :** high arched palate in Marfan Syndrome
7. **Uvula :** see neurology
8. **Odour of the mouth = causes of bad odour :**

| | |
|---|---|
| Acetone | DKA |
| Ammoniacal | Renal failure |
| Alcohol | Alcholol abuser |
| Halitosis | Suppurative lung syndrome (SLS), cancer esophagus , bad oral hygiene |
| Fetor hepaticus | LCF |

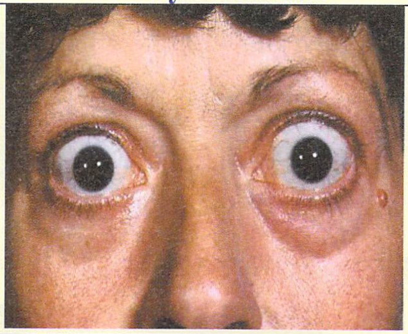
### F. Parotid gland : parotitis enlargement

| | |
|---|---|
| ○ **Epidemic → painful tender unilateral** as in mumps<br>○ **Others:** TB, Leukemia, Sjogren's syndrome | ○ **Endemic → painless bilateral** as in hypoalbuminemia as in cirrhosis & nephrotic syndrome |

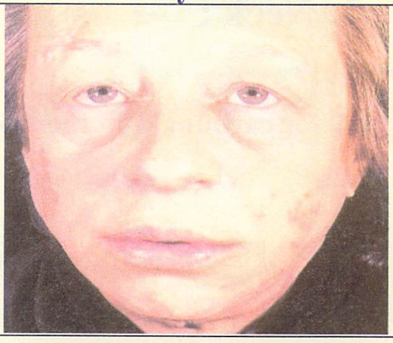
- **Acromegaly**



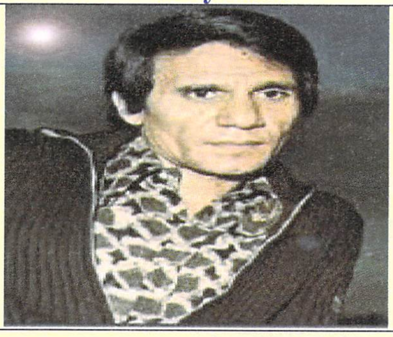
- **Thyrotoxicosis**



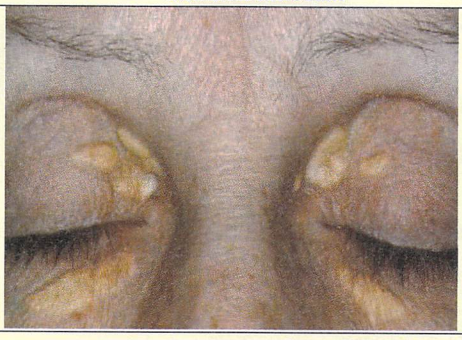
- **Myxedema**



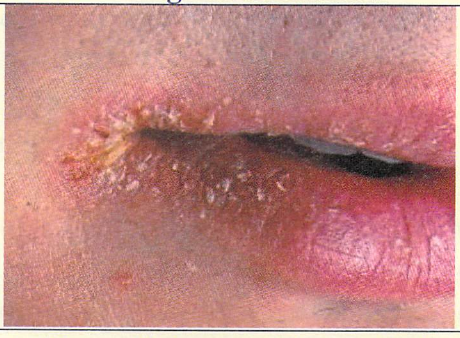
- **Silky Hair**



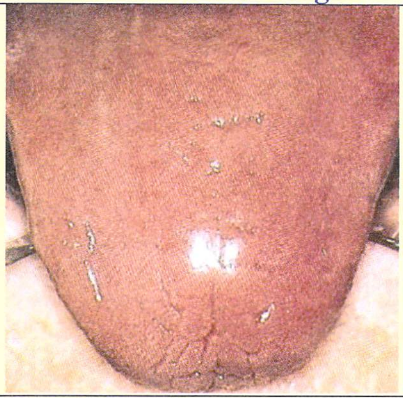
- **Xanthelasma**



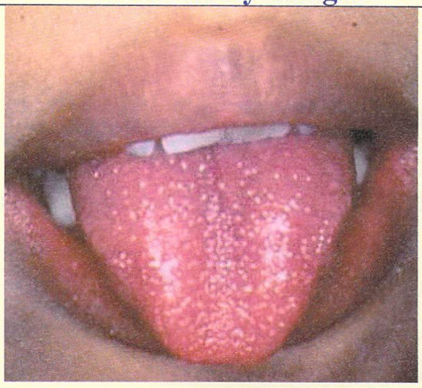
- **Angular Stomatitis**



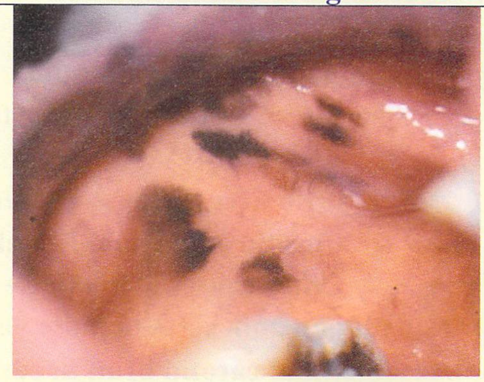
- **Red Glazed Tongue**



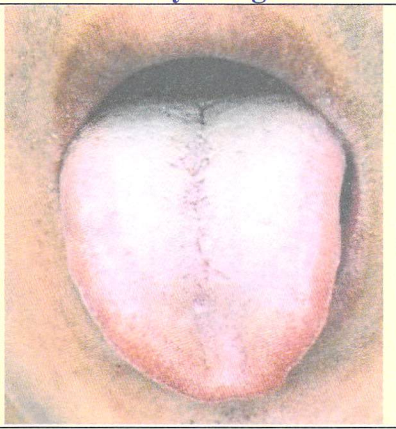
- **Strawberry Tongue**



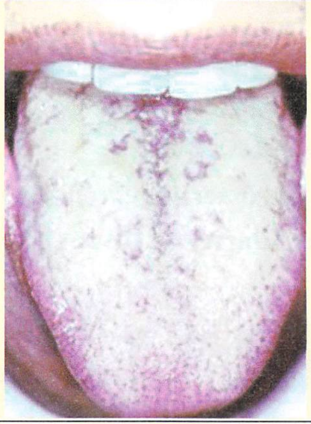
- **Buccal Mucosa : Pigmentation**



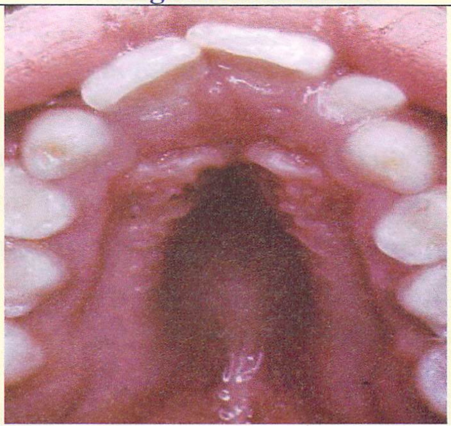
- **Dry Tongue**



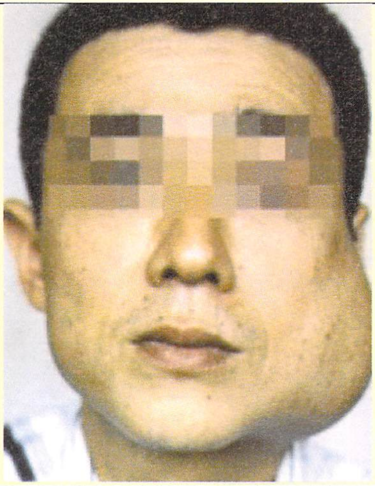
- **Coated Tongue**



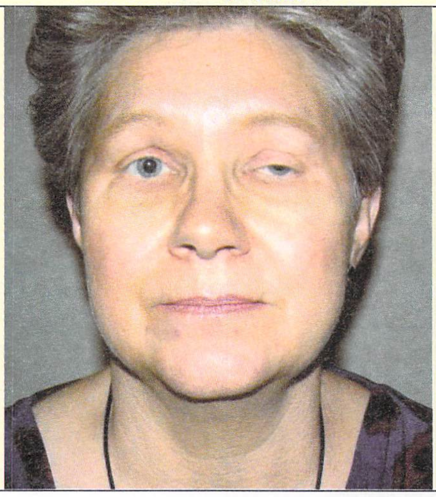
- **High Arched Palate**



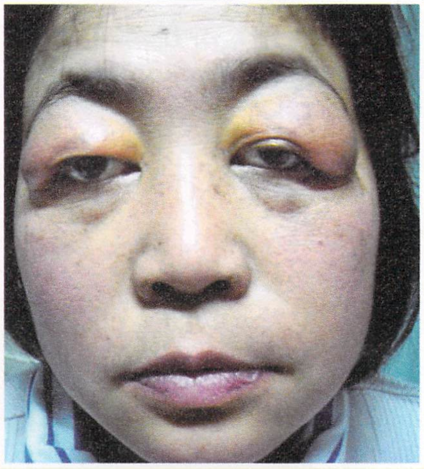
- **Parotid Enlargement**



- **Ptosis**

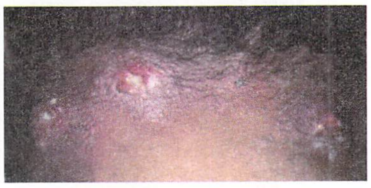


- **Puffy Eyelids**

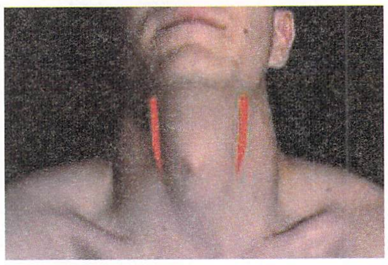


## 2. Neck :

1. **Skin:** for carbuncle on the back in DM ⟹



2. **Lymph Node:** if enlarged continue lymphadenopathy sheet, see LN chapter.
3. **Pulsation :** arterial & venous



### A. Carotid Pulsation :

- ○ **Inspection :** visible arterial pulsation:
  - May be seen in thin people
  - Same causes of big pulse pressure especially AR: " Corrigan's signs"
- ○ **Palpation :**

1) Palpable carotid pulsation or absent carotid pulsation (i.e. Berry's sign) as in thyroid malignancy.
2) Volume
3) In place (felt against carotid tubercle of C6) or displaced
4) Special Character (pulsus bisferiens in Double Aortic lesion & IHSS; idiopathic hypertrophic subaortic stenosis)
5) Carotid Thrill, Timing : Systolic
   - Accompanied by thrill over the base of the heart :
     - ○ AS , PS, PDA
   - No thrill over the base of the heart " initiated from carotids" "carotid shudder" :
     - ○ Carotid aneurysm, Peripheral signs of AR
     - ○ Other causes of big pulse pressure
6) Equality on both sides in pulse volume. (DO NOT examine both carotid in the same time)

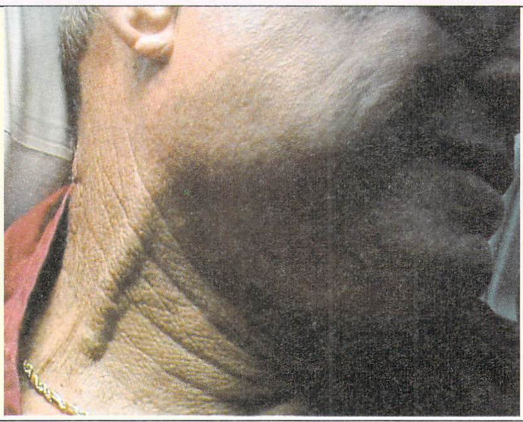
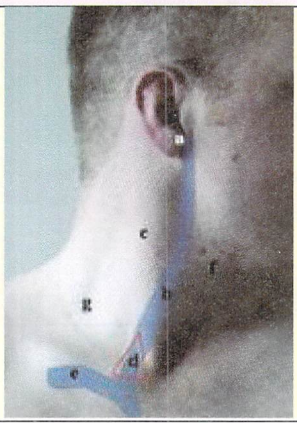
- ○ **Auscultation:** carotid bruit in carotid stenosis

### B. Neck Veins : see later

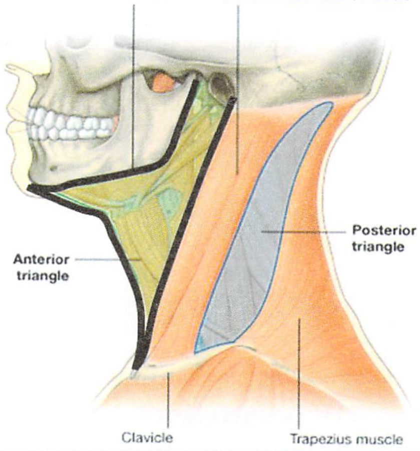
4. **Trachea:** central or shifted. See chest
5. **Thyroid:** see endocrinology.

- **Inspection and describe**
- **Palpation :** for systolic thrill in thyrotoxicosis
- **Percussion :** upper border of sternum (for retrosternal extension)
- **Auscultate :** for systolic bruit (increased vascularity in thyrotoxicosis)

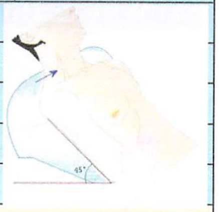
## Neck veins

| External jugular vein | Internal jugular vein |
|---|---|
| ❖ Surface anatomy: | |
| ▪ Line drawn from angle of mandible to mid-clavicular point (junction of medial 1/3 & lateral 2/3) | ▪ Line drawn from lobule of the ear (midway between angle of mandible & mastoid process) to medial end of the clavicle sternoclavicular joint |
|  |  |

## 1) Is it arterial pulsation or venous pulsation? Venous pulsation by :


Inferior border of mandible
Sternocleidomastoid muscle
Posterior triangle
Anterior triangle
Clavicle
Trapezius muscle

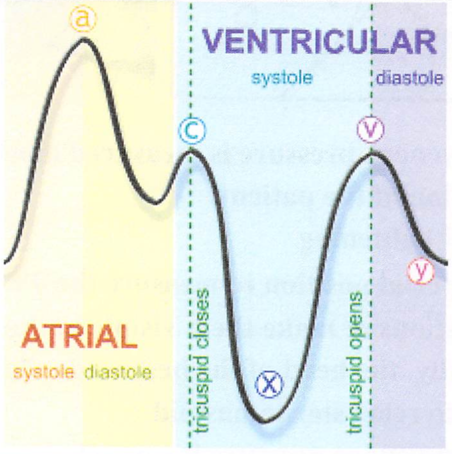
| A. Arterial pulsation = carotid arteries | B. Venous pulsation = neck veins |
|---|---|
| • Medial to sternomastoid, in Anterior triangle of neck | • Lateral to sternomastoid, in posterior triangle of neck |
| • More apparent in upper part of neck | • More apparent in Lower part of neck |
| • NO waves (one jerk) | • Wavy (a & v waves) |
| • Synchronous with heart beat | • Asynchronous with heart beat ( a wave) |
| • Better felt than seen | • Better seen than felt |
| • NOT obliterated by Pressure | • Obliterated by pressure |
| • NOT affected by Posture | • Change with posture |
| • NOT affected by REspiration | • Change with inspiration (↓) |
| • NO hepato-jugular REflux | • Hepato-jugular reflux : (↑) |



❖ Hepato-jugular reflux; one minute abdominal compression test:

- Mild pressure on liver or abdomen leads to elevation of upper level of vein with no affection of artery
- It is positive in Right ventricular failure, TR, TS, Constrictive pericarditis & cardiac tamponade

## 2) What are the waves of neck veins?
## = jugular venous pulse , physiology of the waves:

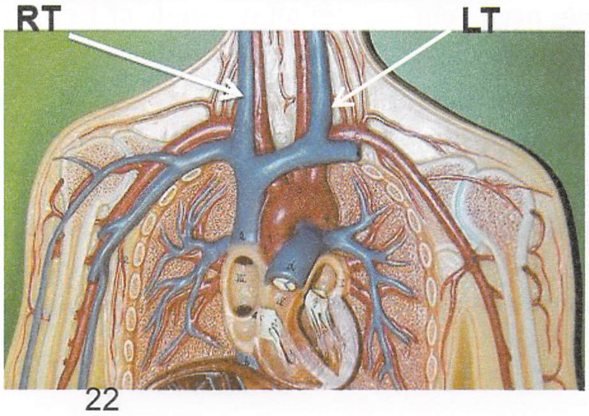

a
VENTRICULAR
systole
diastole
c
v
y
x
ATRIAL
systole diastole
tricuspid closes
tricuspid opens

- Normal JVP = 0-4 cm H2O
- The waves of JVP act as manometer which reflects pressure changes in Right atrium
- Consists of 3 positive (A,C & V) & 2 negatives (X & Y)
- The A wave is normally the highest wave
- The X wave is usually deeper than the Y wave
- Radial pulsation is preferred for timing of the venous pulsation

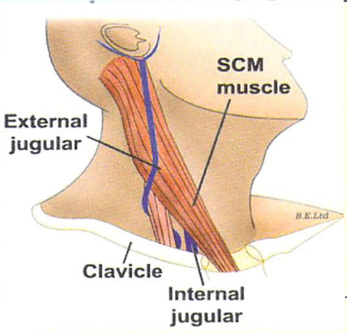
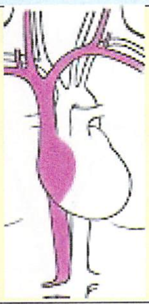
| ❖ Wave | ❖ Represents | ❖ Timing |
|---|---|---|
| ▪ a wave | ○ Right atrial contraction | • Presystolic wave |
| ▪ c wave | ○ Upward bulge of tricuspid valve into right atrium at start of ventricular contraction<br>○ Or Transmitted from adjacent carotids at the onset of ventricular systole | |
| ▪ x descent | ○ Right atrial relaxation (normal systolic collapse) | • Systolic wave |
| ▪ v wave | ○ Right atrial filling from the venous blood | • Systolic |
| ▪ y descent | ○ Right atrial emptying to right ventricle (diastolic collapse) | • Diastolic |

## 3) Which side do you will examine , right or left jugular veins? Right jugular veins

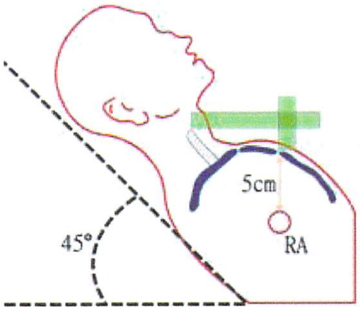
- Right is preferred as Left sided ones may be present falsely prominent (high) as the left innominate vein (Brachio-cephalic) may be compressed by the arch of aorta.

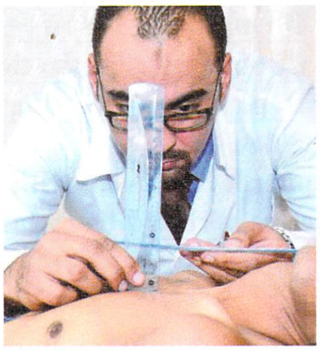


## 4) Is it external or internal jugular veins? **Pulsation of IJV**

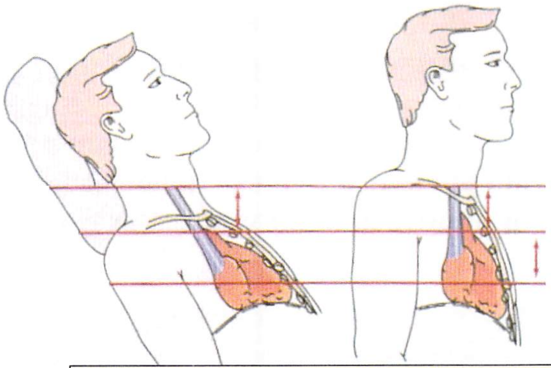
| ❖ External jugular vein | ❖ Internal jugular veins |
|---|---|
|  SCM muscle<br>External jugular<br>B.E.Ltd<br>Clavicle<br>Internal jugular |  |
| | ▪ **Examination:** |
| • The EJV is more superficial and prominent but we don't examine it because<br>- It's prone to kinking and partial obstruction as it traverses the deep fascia of the neck.<br>- It has a tortuous course | ○ IJV is valveless i.e. has no venous valves , so it reflects exactly the changes in right atrium<br>○ It has the most direct channel (direct continuity) to the right atrium<br>• When the pressure in the IJV is elevated you can see a diffuse pulsation not the vein itself. (SO WE ARE EXAMINING THE PULSATION NOT THE VEIN ITSELF) |

## 5) Why & How to measure the jugular venous pressure? **To know either Congested or not congested**





If the pulsation not visible



More elevation up to 60 ° or 90 °

A. The venous pressure is measured most accurately by manometry

B. Position of the patient:

1. Good lightening
2. No special position to measure the JV pressure, the aim to adjust the head of the bed so as to maximize the JV pulsations & make them visible in the lower half of the neck ( above the clavicle, but below the jaw ).
3. Usually, the head of the bed needs slight elevation; 45° from the horizontal, and the face is directed to the left side to relax sternomastoid
4. When venous pressure is severely increased (severely congested neck vein), more elevation up to 60 ° or even 90 ° may be required to make waveform (pulsations) is clearly visible.

C. Measure the vertical distance between the two points :

   a) Put ruler vertically on the manubrio-sternal angle of Louis
   b) Put ruler rectangular on highest point of internal jugular pulsation

D. Possibilities after measurement :

a) Normally, the JVP is visible 2-4 cm above the sternal angle i.e. not congested

b) IF abnormally above 4 cm i.e. congested; comment on the following :

Normal neck veins:
pulsating not congested,
empty with inspiration
with systolic collapse

1. Congested Pulsating neck vein ….. cm above angle of Lewis
2. Relation to respiration:
   - ○ Either empty with inspiration or
   - ○ Expiratory filling & inspiratory collapse in emphysema.
3. Hepato-jugular reflux : +ve or -ve
4. Timing : (Radial pulsation is preferred for timing of the venous pulsation)
   - • Either systolic collapse or systolic expansion
   - ○ All causes are systolic collapse except { AF, TR & cannon a waves → Systolic expansion }

❖ Example for a comment on neck ( with a case of AF):

- Congested pulsating neck veins …. Above angle of Lewis.
- Congestion decreases with inspiration
- Positive hepato-jugular reflux
- There is systolic expansion with absent a wave
- CVP = … cm

## 6) How to measure central venous pressure?

- Pressure in center of Right atrium as measured by a catheter
- CVP = JVP + 5 cm = … cm H2o {Normal CVP = 7 – 10 cm}

## 7) What are the causes of congested neck veins?

| A. Pulsating | B. Non pulsating |
|---|---|
| • ↑ **Right atrial Pressure :** right sided HF, TR | • **Severe Right sided failure :** severe congested neck veins "can't see upper border" |
| • ↑ **intrathoracic Pressure:** physiological (cough, straining), pneumothorax, emphysema | • **Complete SVC obstruction :** thrombosis & mediastinal syndrome |
| • ↑ **Intraabdominal Pressure :** tense ascites | • **Pericardial diseases :** Pericardial effusion & constrictive pericarditis |
| • ↑ **Blood volume:** anemia, pregnancy, fluid overload | |

## 8) What are the common abnormalities in jugular venous pulse? = abnormal waves

| 1. Absent a wave in: | 2. Giant (prominent) a wave (forceful atrial contraction) in : | 3. Cannon a waves (synchronous atrial & ventricular contraction) in: |
|---|---|---|
| • AF (no atrial contraction) | • TS<br>• PS<br>• Pulmonary hypertension | ➯ **Regular:**<br>○ Nodal rhythm<br>○ Paroxysmal nodal tachycardia<br>➯ **Occasionally :**<br>○ Atrio-ventricular dissociation e.g. paroxysmal ventricular tachycardia & complete heart block |
| **4. Causes of giant v wave or causes of obliteration of x descent?**<br>• Systolic expansion; AF , TR | | |
| 5. Prominent x descent in: | 6. Prominent y descent in : | 7. Attenuated or absent y descent in : |
| Constrictive pericarditis | Constrictive pericarditis | Pericardial effusion |
| Pericardial effusion | | |

**8. Neck veins in constrictive pericarditis show 2 signs:**

1. **Kussmaul sign:** congested neck veins showing inspiratory filling (Reverse of the normal)
2. **Friedriech 's sign:** congested Neck veins showing sudden severe diastolic collapse (rapid & deep Y decent)

## 3. Upper limb, examine BOTH sides

**1. Skin of the hand:**

| | |
|---|---|
| A. Elasticity : *tense in* scleroderma & edema, *loose in* loss of weight | B. Thickness : *thick in* acromegaly, myxedema , *atrophy in* peripheral neuritis |
| C. Dry skin : myxedema | D. Excessive sweating in thyrotoxicosis & neurosis |

**2. Shape of the hand :**

A. Square in cretinism

B. Spade like hand in acromegaly (large & broad)

C. Arachnodactyly (spider finger) long tapering fingers as in Marfan syndrome

D. Dupuytren's contracture: "pulmar fibromatosis" : fibrosis of palmar aponeurosis with flexed inner 2 or 3 fingers; Causes :

- Idiopathic : familial
- Secondary : DM, alcoholism & alcoholic liver cirrhosis

**3. LN of the hand : see later**

**4. Pulse & blood Pressure (see before)**

**5. Palm:**

A. Palmar erythema: definition :

○ Erythema in thenar & hypothena eminences and over the pulps of fingers with central pallor

**❖ Causes of palmer erythema :**

- P : Polycythemia, Pregnancy
- A : Alcohol intake, Autoimmune (RA,SLE)
- L : Liver cell failure , Leukemia
- M : Medications (CCPs, Corticosteroids ), Miscellaneous (Thyrotoxicosis)

B. Pallor in palmer creases in anemia

| | |
|---|---|
| C. Sweating in palm & dorsum & warm hand in: Thyrotoxicosis | D. Sweating in palm only & cold hand in : neurosis |

**6. Nail**: normally : shiny, convex in lateral view and obtuse nail bed angle; 160 degrees

**❖ TCKSLY :** تكسلي

A. Trophic changes: in the form of loss of luster, striated, brittle nails as in polyneuropathy, iron deficiency & chronic ischemia.

B. Terry's nail : distal half is brown while proximal half is white-pink in LCF & CRF

C. Cyanosis (central or peripheral) , Clubbing, Capillary pulsation in AI

D. Koilonychia (nail spooning): flat then concave in iron deficiency anemia

E. Splinter Hemorrhage in SBE

F. Leukonychia: white nail in hypoalbuminemia as in LCF, Nephrotic syndrome & normal

G. Yellow nail syndrome : yellow in colour + peripheral oedema + bronchiectasis + pleural effusion)

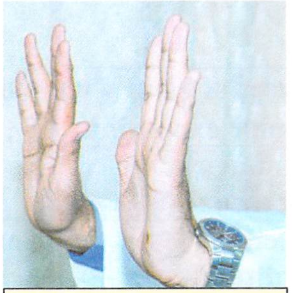
**7. Nodules :**

A. Osler's nodes in pulps of finger in SBE

B. In osteoarthritis : Herberden's nodules: in DIP , Bouchard nodules : in PIP.

C. Subcutaneous nodules in rheumatic fever & Rheumatoid arthritis

D. Gouty tophi



Flapping tremors

**8. Clubbing :** see later.

**9. Colors :**

- Yellowish brown in chronic renal failure.
- Reddish blue or purple discoloration of the skin that doesn't blanch on pressure :

| | | |
|---|---|---|
| ○ Petechiae : less than 2 mm | ○ Purpura: 2 mm to 1 cm | ○ Ecchymosis : more than 1 cm |

**10. Trophic changes:**

○ Ulcers, Loss of Hair & Brittle nail

Fine tremors

**11. Tremors:** اطلب من العيان يغمض عينه

✌ Fine tremors : use a paper sheet

✌ Flapping tremors = coarse tremors = asterixis : rapid flexion & extension at the wrist & MCP joints

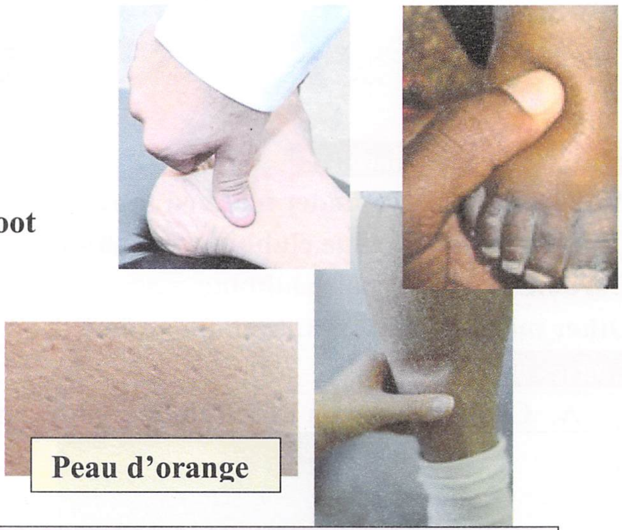
→ How to examine : outstretched arms, supported & fanning of fingers

→ Induced by sudden dorsiflexion of the pronated wrist.

**12. Joints & Deformity:** See later in each system (neurology, rheumatology , …etc.)

**13. Muscles & nerves :** Sensation, Muscle wasting ,Movement, power & Reflexes; see neurology.

## 4. Lower limb, examine BOTH sides


Peau d'orange

### A. Odema:

- **Technique :** by 1 minute pressure test
- **Sites :** behind medial malleolus , chin of tibia & dorsum of foot
- **Other sites :** sacrum over the back in bedridden patients

❖ **After pressure look for:**

1) **Tenderness :** Tender or not
2) **Type :** pitting or non-pitting (non-pitting in myxedema)
3) **Laterality :** bilateral or unilateral
4) Symmetrical or not by tape.
5) **Extent :**

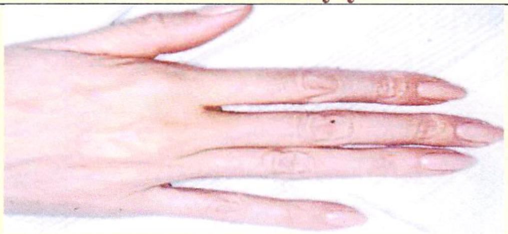
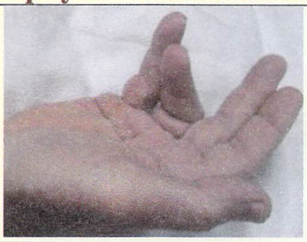
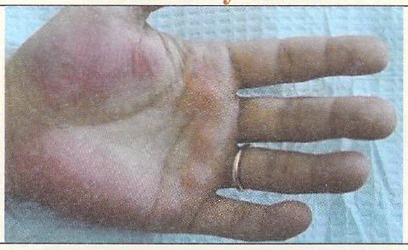
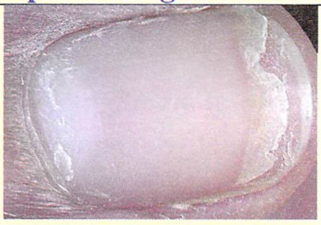
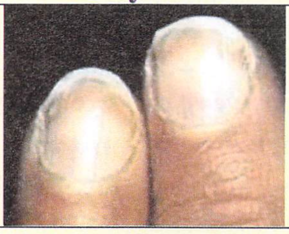
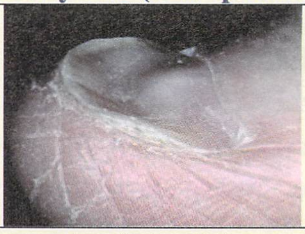
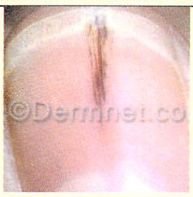
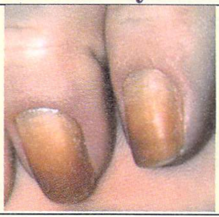
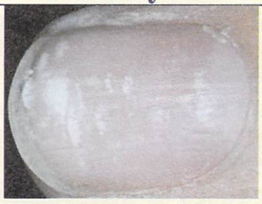
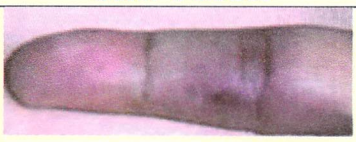
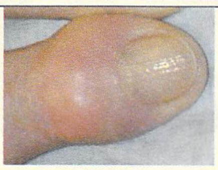
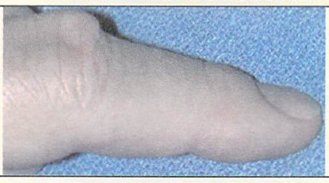
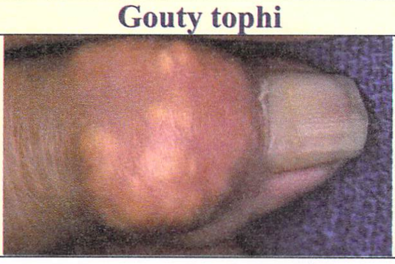
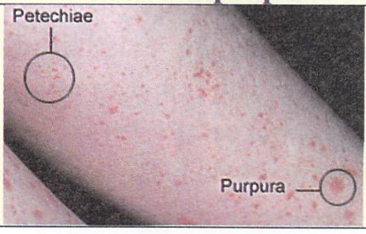
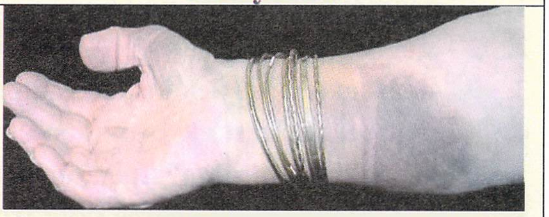
| ☞ If below knee : | ☞ If above knee: |
|---|---|
| ○ Above ankle<br>○ Mid leg (medial side of leg)<br>○ Below knee (tibial tuberosity) | ○ Pinching test over the thigh<br>○ Peau d'orange over the anterior abdominal wall |

6) **General assessment of the patient with lower limb edema :**

- ○ Examine the liver & heart
- ○ Examine back for sacral oedema
- ○ Examine serous sacs for ascites, pericardial or pleural effusion

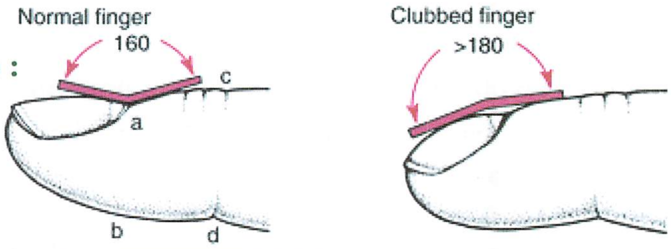
### B. Rest of examination as upper limb but:

- In clubbing we detect it by inspection only
- No tremors

| | | |
|---|---|---|
| **Arachnodactyly** | **Dupuytren's contracture** | **Palmar erythema** |
|  |  |  |
| **Trophic changes in the nail** | **Terry's nail** | **Koilonychia (nail spooning)** |
|  |  |  |
| **Splinter Hemorrhage** | **Yellow nail syndrome** | **Leukonychia** |
|  |  |  |
| **Osler's nodes** | **Herberden's nodules** | **Bouchard nodules** |
|  |  |  |
| **Gouty tophi** | **Petechiae & purpura** | **Ecchymosis** |
|  |  |  |

# Clubbing

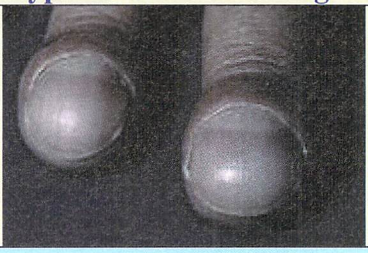
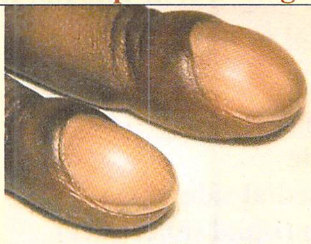
### ❖ Definition & mechanism:



❖ **Proliferation of CT under nail bed in response to :**

1. **Chronic hypoxia : blue clubbing = cyanotic**
2. **Chronic toxemia : pale clubbing = acyanotic**
3. **Other mechanisms: irritation, immune.**

### ❖ Causes of clubbing :

| A. Chronic hypoxia : blue clubbing = cyanotic | B. Chronic toxemia : pale clubbing = acyanotic |
|---|---|
|  |  |
| ❖ Hypoxia leads to clubbing within several months and even years | ❖ Toxemia leads to clubbing within few weeks |
| **Cardiac** | |
| • Congenital cyanotic Heart disease with Right to Left shunts: Eisenmenger's, F3 & F4 | • Subacute bacterial endocarditis |
| **Chest** | |
| • COPD; clubbing usually mild – marked in associated bronchiectasis<br>• Interstitial pulmonary fibrosis | • Suppurative lung syndromes : lung abscess , bronchiectasis, empyema & cystic fibrosis<br>• Fibroid type of pulmonary TB<br>• Bronchogenic carcinoma<br>• Pleural methothelioma |
| **Abdominal** | |
| • Liver cirrhosis especially primary biliary cirrhosis | • Ulcerative colitis & chrohn's disease<br>• Familial polyposis & Bilharzial polyposis<br>• Steatorrhea |

C. **Occupational :** shoe makers , carpenters (usually in thumb & index)

D. **Miscellaneous :**

- ○ **Familial :** 5 % of cases
- ○ **Thyroid acropachy:** in 1 % of patient with Graves : clubbing + exophthalmos + pretibial myedema
- ○ **Primary hypertrophic osteoarthropathy; Pachydermoperiostosis :** Characterized by pachydermia(thickening of the skin), periostosis (excessive bone formation) and finger clubbing.

### ❖ What are the causes of reversible clubbing?

- Pleural methothelioma, endocarditis, empyema

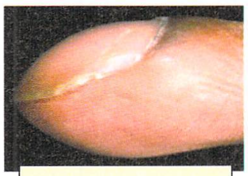
### ❖ What are the causes of unilateral clubbing?

- As same causes of unequal pulse

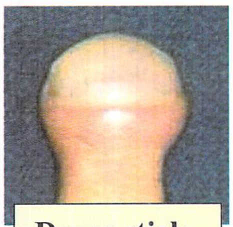
### ❖ What are the causes of clubbing in LL only (differential clubbing) ?

- Same causes of differential cyanosis

### ❖ Degrees "grades" :



Parrot peak

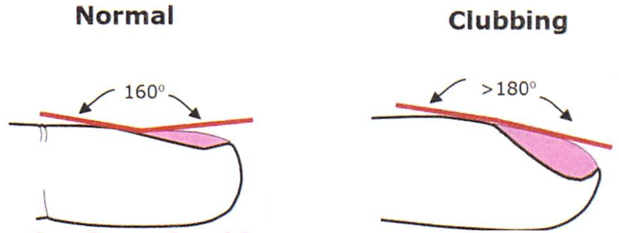


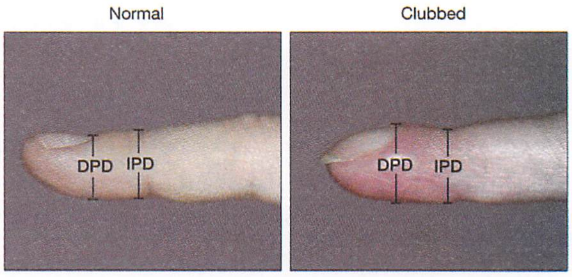
Drum stick

1. **1st degree:** obliterated nail bed (window or Schamroth's sign) & fluctuation is present.
2. **2nd degree:** parrot peak i.e. ↑ of curvature of the nail in its longitudinal axis.
3. **3rd degree:** drum stick i.e. swelling of the pulp of the finger in all its dimension.
4. **4th degree: drum stick + pulmonary hypertrophic oestoarthropathy** i.e. tender thickening of ends of long bones " radius & ulna", it is due to subperiosteal new bone formation, so it's an X-ray finding.

❖ **N.B. if intermediate degree say** : from … passing to … e.g. from parrot peak passing to drum sick.

## ❖ Diagnosis of clubbing :





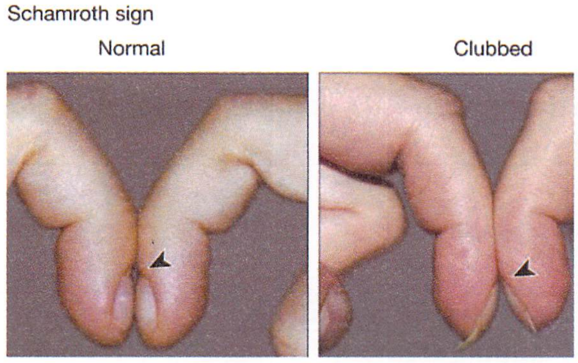
1. **Inspection from the side:**

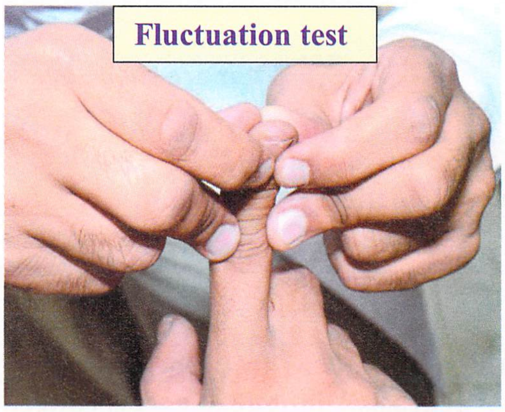
A. **Lovibond angle :** the angle between the nail base and it's adjacent skin

- ○ Normal Lovibond angle: is 160°
- ○ Abnormally : clubbing : obliteration of the Lovibond angle i.e. ≥ 180 degree according to shape , you can determine the degree .

B. **Phalangeal depth ratio :**

- ○ Normally : interphalangeal depth (IPD) is more than distal phalangeal depth (DPD)
- ○ Abnormally : clubbing : the ratio is altered





2. **Window sign or Schamroth's sign:** ask the patient to approximate the dorsal surface of both finger nail opposite each other, normally a window is seen, absence of this window suggests 1st degree of clubbing
3. **Fluctuation test :**

♥ تسند صباع العيان بال 2 thumbs وتيجي بال 2 indices وتدوس على زاويتي اتصال الظفر باللحم في نفس الوقت كذا مرة

- Place the finger on the pulp of the examiner's two thumb and hold in this position by gentle pressure with the tips of the middle fingers over the proximal interphalangeal joint
- Then palpate the finger over the base of the nail with tips of examiner's two index fingers.
- When fluctuation is marked, palpation of the nail itself may give the impression that is floating free in its bed.

4. **Floating test:** press on the tip of the nail → floatation of the part under the skin.

## ❖ Differential Diagnosis of clubbing = causes of pseudo-clubbing:

☞ **Definition:**

- ○ Over curvature of the nails in both the longitudinal and transverse axes, with preservation of a normal nail bed angle

☞ **Causes of pseudo- clubbing:**

| | |
|---|---|
| ▪ Abscesses of the terminal pulp space<br>▪ Chronic Paronychia | ▪ HyperParathyroidism<br>▪ Chronic renal failure |
| ▪ Subungual hematoma | ▪ Sarcoidosis, Scleroderma |

**❖ Finally : comment on the following in a case of clubbing**

- ♥ Present or not
- ♥ Distribution : generalized (UL & LL) or differential (LL only)
- ♥ Degree : قول الوصف متقولش الرقم لان هناك اختلاف في الأرقام
- ♥ Type : cyanotic (blue) or toxemia (pale)
  - ○ Cyanotic clubbing : cyanosis in tongue & hands & warm hands

# CLINICAL DISCUSSION

### ❖ What are the Causes of edema ?

| A. Generalized edema (bilateral): | B. Local edema (unilateral) = causes of tender edema = causes of edema in one UL or LL: |
|---|---|
| 1. **Cardiac edema :** congestive HF, pericardial effusion<br>2. **Renal edema :** nephritic or nephrotic syndromes<br>3. **Hepatic edema :** liver cell failure<br>4. **Nutritional edema :** severe nutritional deficiency or malabsorption syndrome<br>5. **Angioneurotic edema :** allergic edema | 1. **Inflammatory e.g. cellulitis:** signs of inflammation as redness, hotness & tenderness<br>2. **Lymphatic obstruction e.g. lymphedema :** edema is non pitting<br>3. **Venous obstruction e.g. D.V.T:** dilated veins will be present. |

### ❖ What are the Causes of pitting & non pitting oedema ?

| | |
|---|---|
| ▪ **Soft pitting (low protein content) :** renal, cardiac & hepatic | ▪ **Hard non pitting (high protein content):** Lymphatic obstruction & myxedema |

### ❖ What are the Causes of tremors ?

| A. Fine (↓ amplitude, ↑ frequency): | B. Coarse (↑ amplitude, ↓ frequency): |
|---|---|
| ▪ Anxiety "neurosis", fatigue & excess coffee, tobacco<br>▪ Thyrotoxicosis "fine rapid tremors "<br>▪ Toxic: alcohol, mercury, cocaine<br>▪ ß2 agonist<br>▪ Familial , Fatigue, Senile | ▪ Flapping tremors "Astrexis" : Metabolic encephalopathy especially organ failure as liver, renal, respiratory failure.<br>▪ Parkinsonism: coarse slow static tremors (at rest & disappear by movement)<br>▪ Cerebellar ataxia: Intension kinetic tremors; during movement |

### ❖ What are the Causes of puffy eye lid?

| | |
|---|---|
| ❖ **Edema :**<br>▪ **Generalized :** Renal diseases (nephrotic or nephritic), as a part of generalized oedema (rare)<br>▪ **Local :** angio-neurotic oedema | ❖ **Increase : ↑**<br>▪ **↑ intrathoracic pressure** in Chronic chough<br>▪ **↑ venous pressure :** SVC obstruction , congestive HF, pericardial effusion, constrictive pericarditis |
| ❖ **Deposition : myxedema** | |

| ❖ What are the hazards of smoking ? | ❖ What are the hazards of alcohol consumption ? |
|---|---|
| ▪ **Chest:** Chronic bronchitis, COPD, Bronchogenic carcinoma & Cancer: lip, tongue, pharynx & larynx | ▪ **CNS:** Wernicke-Korsakoff syndrome, Polyneuropathy & Tremors |
| ▪ **CVS:** Ischemic heart disease, arrhythmias , stoke , Peripheral vascular disease | ▪ **CVS:** Cardiomyopathy |
| ▪ **GIT:** Peptic ulcer & gastritis, Cancer: esophagus, stomach, bladder | ▪ **GIT:** Alcoholic cirrhosis, Pancreatitis, peptic ulcer |

### ❖ What are the values of fundus examination:

| | |
|---|---|
| 1) **Hypertensive retinopathy** | 2) **Diabetic retinopathy** |
| 3) **Infective endocarditis :**<br>▪ In central Retinal artery : occlusion by embolism gives snow white Retina<br>▪ Roth spots (vasculitis): small red petichae with pale white centers | 4) **Systemic lupus erythematosus :**<br>▪ Hard exudates (cytoid bodies)<br>▪ Hemorrhages<br>5) **Arterial pulsation in AR** |

## ❖ What do you know about Xanthomas (Xanthomata) ?

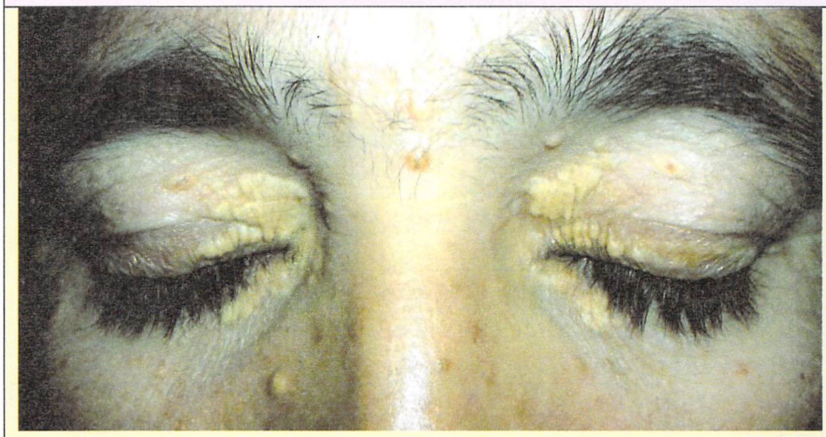
☞ Definition : Xanthomas are smooth surfaced yellow or orange plaques or nodules in the skin due to focal dermal aggregations of lipid-loaded cells (foamy histocytes)

☞ Different types of hyperlipidemia may induce varying patterns of xanthomas:

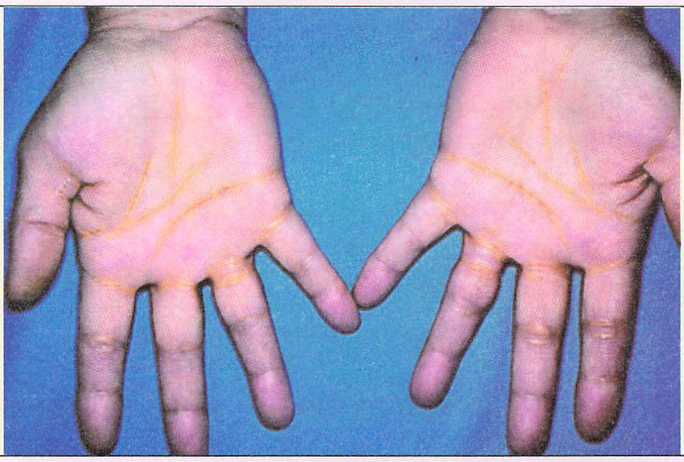
| | |
|---|---|
| **1. Xanthelasma :**<br>▪ Subcutaneous deposits of cholesterol just medial to the eyelids (with type IIA & III or without lipid abnormality) | **2. Plane xanthoma:**<br>▪ On palmer creases (Type III)<br>▪ Also occur with primary biliary cirrhosis |
| **3. Tuberous xanthoma:**<br>▪ Over the joints especially knees and elbow (type IIA, III) | **4. Tendinous xanthoma:**<br>▪ Over the tendons e.g. Achilles tendon , patellar tendon & finger extensor tendons (Types IIA & III) |
| **5. Eruptive xanthoma:**<br>▪ Occur on the buttocks, posterior thighs (hyperlipidemia type I , IIB, III, IV & V)<br>▪ Also occur with primary biliary cirrhosis | |

☞ Treatment : Lipid lowering agents, Plasmapheresis & Liver transplantation

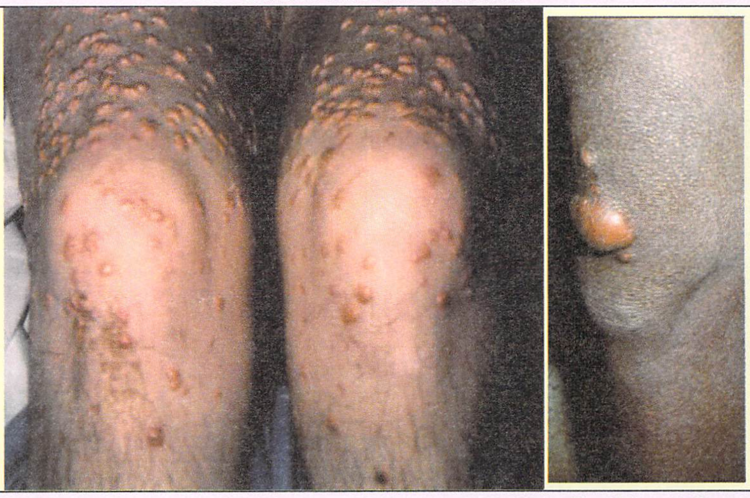
**1. Xanthelasma :**



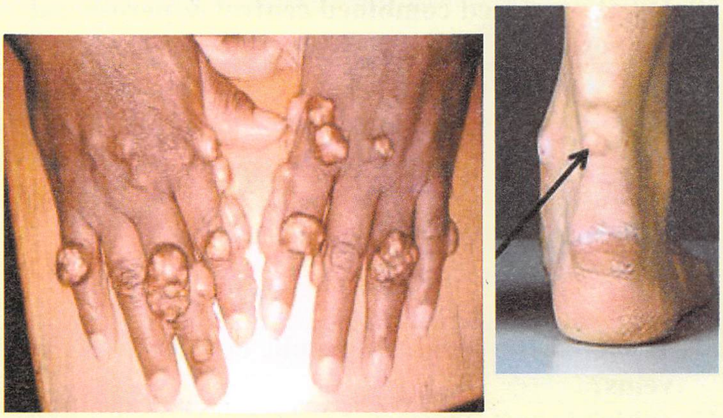
**2. Plane xanthoma:**



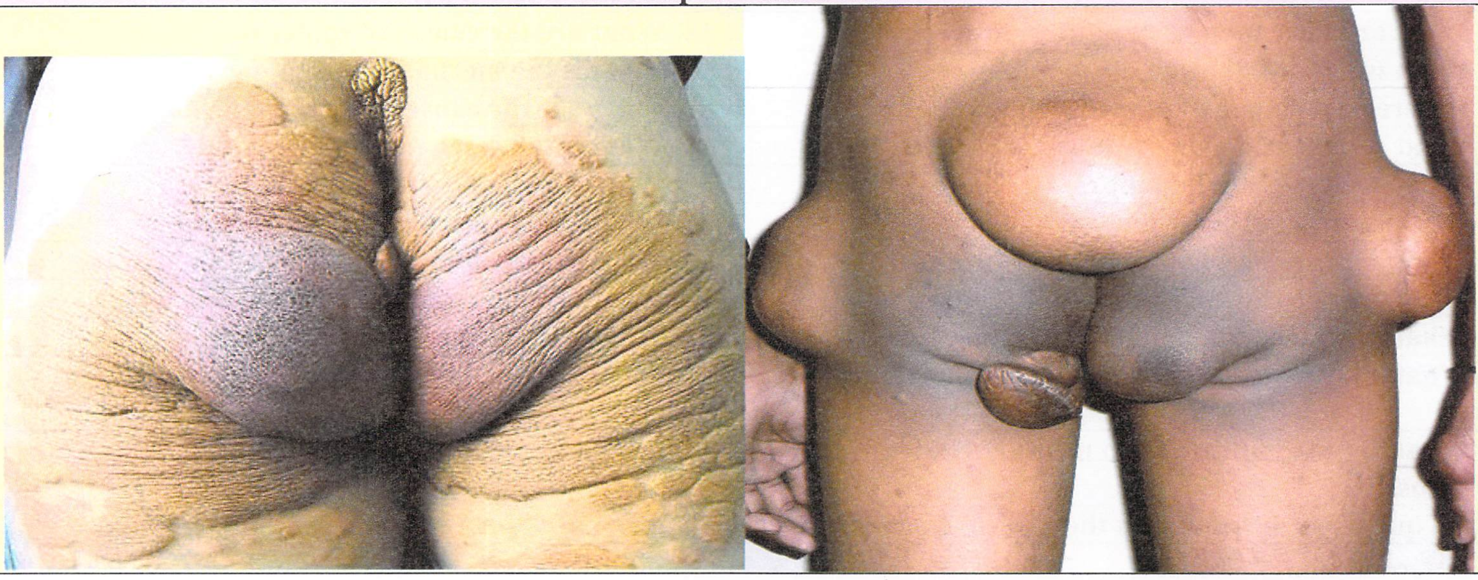
**3. Tuberous xanthoma:**



**4. Tendinous xanthoma:**



**5. Eruptive xanthoma:**



# FREQUENTLY ASKED QUESTIONS FOR MID & END ROUND EXAM

## Test yourself!

1. What is meant by body mass index?
2. What are the causes of orthopneic position ?
3. What are other decubiti you know ?
4. What is normal heart rate?
5. What are the causes of bradycardia?
6. What are the causes of tachycardia?
7. What is meant by pulse deficit?
8. How to differentiate between irregular pulse of AF & extrasystoles?
9. What are the causes of big pulse volume?
10. What are the causes of small pulse volume ?
11. What are the causes of variable pulse volume?
12. What is meant by pulsus alternans?
13. How to diagnose pulsus alternans by sphygmomanometer?
14. What is the mechanism of pulsus alternans in severe LVF?
15. What is meant by pulsus paradoxicus?
16. How to diagnose pulsus paradoxicus by sphygmomanometer?
17. What are abnormal pulse characters ?
18. What are the synonym of water hammer pulse?
19. What are the causes of unequal pulse volume?
20. What is meant by radiofemoral delay?
21. What is mean by force & tension ?
22. Why do we use palpatory method before auscultatory method in measurement of ABP?
23. What is the auscultatory gap ?
24. What is normal BP?
25. What is normal temperature?
26. What is the difference between fever & hyperpyrexia?
27. What are causes of puffiness of eye lids?
28. What are causes of red glazed tongue?
29. What are the causes of bad odour of the mouth?
30. Define jaundice?
31. What is the normal level of serum bilirubin?
32. Why do you inspect jaundice in daylight?
33. Why do you inspect jaundice in sclera?
34. What are other causes of yellow skin?
= what is the DD of jaundice ?
35. What is the difference between different types of jaundice?
36. Define cyanosis ?
37. What are the causes of central cyanosis ?
38. What are the causes of peripheral cyanosis ?
39. What produced combined central & peripheral cyanosis ?
40. How to unmask peripheral cyanosis in a patient with combined central & peripheral cyanosis ?
41. Can severe anemia produce central cyanosis?
42. What is meant by differential cyanosis?
43. Why doesn't peripheral cyanosis affect the tongue ?
44. When can peripheral cyanosis affect the tongue?
45. What is the difference between central & peripheral cyanosis?
46. What are the causes of butterfly rash?
47. Where would you like to see pallor ?
48. What are the causes of pallor?
49. What is the normal JVP?
50. What are the causes of ↑ JVP (congested neck veins)?
51. What are the causes of systolic expansion of neck veins?
52. What are causes of giant a wave ?
53. Which is better to examine IJV or EJV & why?
54. Which is better to examine Rt IJV or Lt IJV?
55. What are the causes of congested non pulsating neck veins?
56. What are the differences between neck vein & carotid pulsations?
57. What are the causes of carotid shudder?
58. What are the causes of spider nevi?
59. What is the distribution of spider nevi?
60. What is the mechanism of spider nevi?
61. Differential diagnosis of spider nevi?
62. What are the causes of tender edema of LL?
63. What are the causes of bilateral edema?
64. What is the mechanism of clubbing?
65. What are types of clubbing?
66. What are the degrees of clubbing?
67. What is the test that detects mild clubbing?
68. What are the cardiac causes of clubbing?
69. What are the chest causes of clubbing?
70. What are the abdominal causes of clubbing?
71. What are the causes of palmer erythema ?
72. What are the causes of flapping tremors ?
73. What can cause spooning of nail ?
74. What are the causes of white nail?
75. What are the causes of Dupetryn's contracture?
76. What are the special characters with carotid artery & aortic valve disease ?
77. What are the indications to measure BP in lower limbs?
78. Causes of orthopnea?
79. All questions answered in the clinical discussion are very important

# SUMMARY OF GENERAL EXAMINATION

## I. Vital signs

1. **Temperature:** orally : Normal : 36.5 – 37.2 ºC
2. **Pulse : RR-VV-SEP**

- Rate : normally : 60-100 b/m
- Rhythm : regular or irregular (AF)
- Volume : average , small or big.
- Condition of vessel wall: not felt
- Equality on both side in pulse volume: equal
- Peripheral pulsations: inatct

3. **Blood pressure**

- Normal range:
  - Systolic from 90 to 140 mmHg
  - Diastolic from 60 to 90 mmHg

4. **Respiratory movements :**

- Rate : Normal : 12-20/min
- Rhythm : regular
- Depth : average
- Type of breathing :
  - Females : thoraco-abdominal
  - Males : abdmino-thoracic

## II. General overview; ABCCDE

❖ **A**ppearance, **B**uilt & height, **C**onsciousness, **C**olours, **D**ecubitus & facial **E**xpression.

5. **Colour:**

1. Jaundice: Examined in lower fornix of the sclera ; asking the patient to look upwards and facing the day light
2. Cyanosis: in undersurface of tongue & hands
3. Pallor: slightly pull the lower lip outward & look for the colour inside, palmer creases

## III. Systemic overview

### A. Head

1. Head
2. Eye
3. Nose
4. Butterfly area
5. The mouth:
   - ▪ Angle of the mouth
   - ▪ Lips
   - ▪ Teeth
   - ▪ Tongue:
     - Size
     - Colour
     - Papillae
     - Surface
     - Movements
   - ▪ Buccal mucosa
   - ▪ Palate
   - ▪ Uvula
   - ▪ odour
6. Parotid gland

### B. Neck

1. Skin
2. Lymph node
3. Pulsations:
   - Carotid pulsations
   - Neck veins
4. Trachea
5. Thyroid

### C. Upper limbs

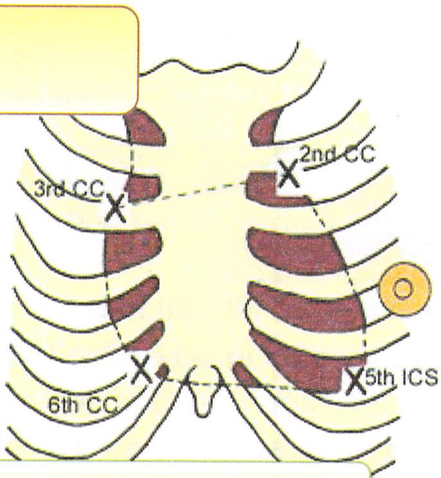
1. Skin of the hand
2. Shape of the hand
3. LN of the hand
4. Pulse & BP
5. Palm
6. Nail: TCKSLY
7. Nodules
8. Clubbing
9. Colours
10. Trophic changes
11. Tremors:
    - Fine tremors
    - Coarse "flapping" tremors
12. Joints & Deformity
13. Muscles & nerves

### D. Lower limbs

- Oedema
- As upper limb

### E. Other systems except that of local examination

# CARDIOLOGY

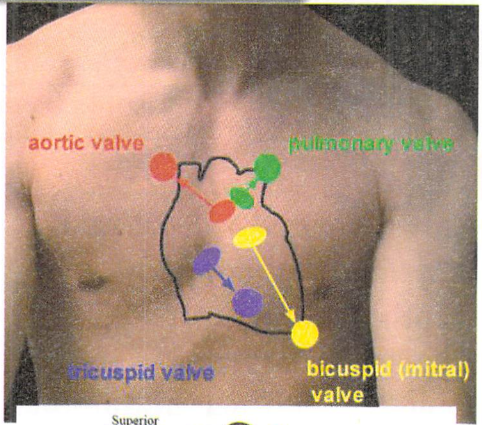

3rd CC
2nd CC
6th CC
5th ICS

## ❖ Surface anatomy of the heart : 4 points

A. Right border : represented by a line between two points:
  1. Right 3rd costal cartilage 3 cm from midline
  2. Right 6th costal cartilage 3 cm from midline

B. Left border : represented by a line between two points
  3. Left 2nd costal cartilage 4 cm from midline
  4. Left 5th intercostal space 9 cm from midline (apex of the heart)

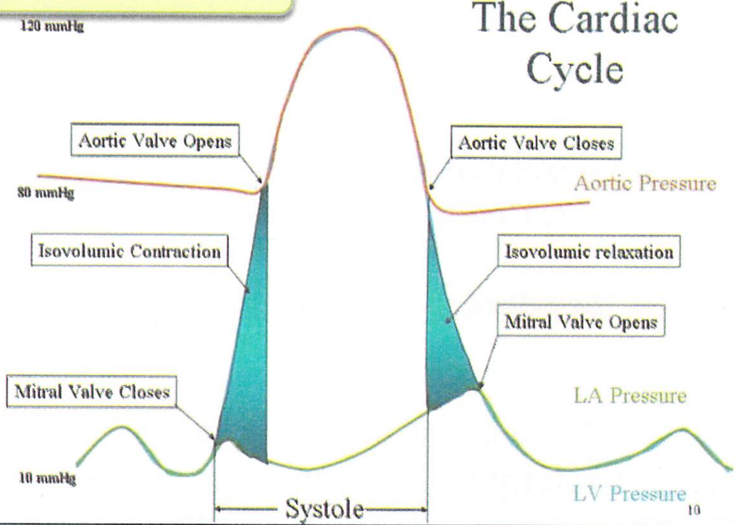
## ❖ Surface anatomy of cardiac valves : adjacent to left border of sternal body :

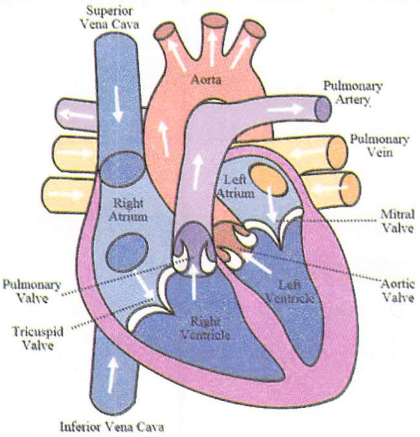

aortic valve
pulmonary valve
tricuspid valve
bicuspid (mitral) valve

a) The SemiLunar (SL) valves :
1. Pulmonary valve : left 3rd sternocostal junction
2. Aortic valve : left 3rd intercostal space (lateral border of sternum)

b) The AtrioVentricular (AV) valves :
3. Mitral valve : left 4th sternocostal junction
4. Tricuspid valve : left 4th intercostal space (behind center of sternum)

## ❖ Cardiac cycle: = 0.8 sec.



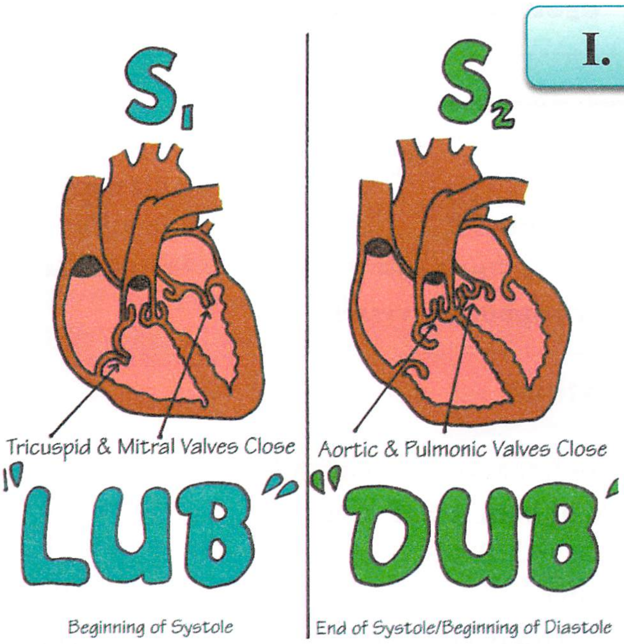

Superior Vena Cava
Aorta
Pulmonary Artery
Pulmonary Vein
Left Atrium
Right Atrium
Mitral Valve
Aortic Valve
Left Ventricle
Right Ventricle
Pulmonary Valve
Tricuspid Valve
Inferior Vena Cava

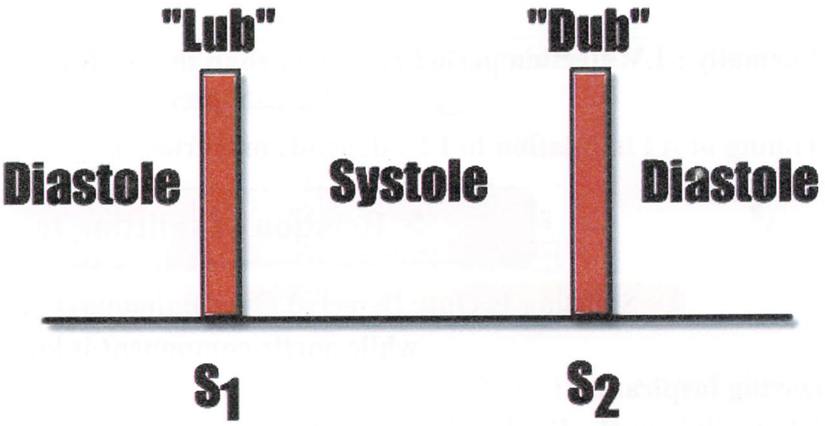
| I. Systole (0.3 sec) : | II. Diastole (0.5 sec) : |
|---|---|
| **1. First heart sound :** | **4. Second heart sound:** |
| • The cardiac cycle start by contraction of ventricles resulting in closure of mitral & tricuspid valves producing the first heart sound (S1) | • After evacuation of blood, the ventricles relax, so the pressure in the aorta and pulmonary artery will exceed the pressure in the ventricles resulting in closure of aortic & pulmonary valves producing the second heart sound (S2) |
| **2. Isometric contraction phase:** | **5. Isometric relaxation phase:** |
| • The ventricles continue to contract while the 4 valves of the heart are closed, so the pressure inside the ventricles rises rapidly without change in the volume | • The ventricles continue to relax while 4 valves of the heart are closed, so pressure inside the ventricles falls rapidly without change in the volume. |
| **3. Ejection phase:** | **6. Ventricular filling phase:** |
| • When the pressure in the ventricles exceeds the pressure in the aorta & pulmonary artery, the aortic & pulmonary valves will open (normally with no sound)<br>• Then the blood rushes from the ventricles to the aorta and pulmonary artery,<br>○ First rapidly: maximum ejection phase<br>○ Then slowly: reduced ejection phase | • When the pressure in the ventricles becomes lower than the pressure in the atria, blood flows to the ventricles passively,<br>○ First rapidly : maximum filling phase<br>○ Then slowly : reduced filling phase |
| | **7. Atrial systole:** |
| | • The last amount of blood in the atria is pushed actively by atrial contraction in the late diastole. |
| **8. Ventricular contraction:** occurs again & the cycle is repeated. | |
| ❖ N.B.: any change in heart rate , is a change in diastole, systole is constant :<br>• Tachycardia shortens diastole while Bradycardia lengthens diastole | |

## ❖ Heart Sounds and their relation to cardiac cycle:

I. Heart sounds (S1,S2,S3,S4)
II. Additional heart sounds (Systolic clicks & opening snap)
III. Murmurs
IV. Others heart sounds (Pericardial rub, pericardial knock, crepitations & metallic click)

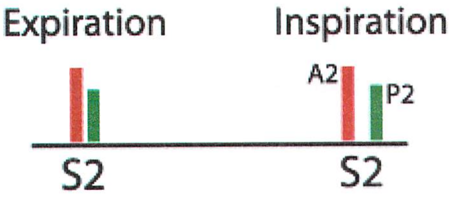
## I. Heart sounds

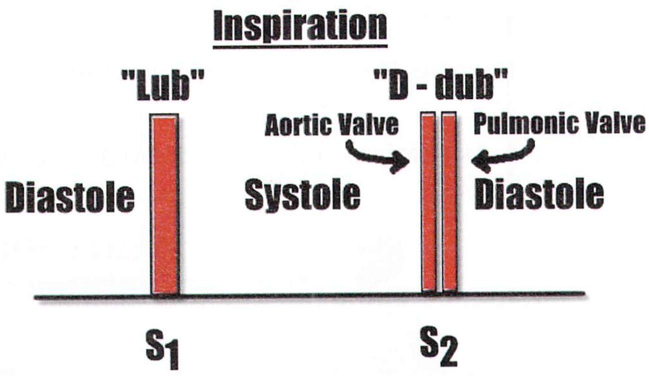

S1
Tricuspid & Mitral Valves Close
"LUB"
Beginning of Systole
S2
Aortic & Pulmonic Valves Close
"DUB"
End of Systole/Beginning of Diastole



| 1. First heart sound, S1 | 2. Second heart sound, S2 |
|---|---|
| ❖ Time: | |
| ▪ Beginning of systole | ▪ Beginning of diastole |
| ❖ Caused by : | |
| ▪ **Valvular:** closure of A-V (mitral & tricuspid) valves<br>▪ **Muscular:** early ventricular contraction vibrations of chorda tendinae & papillary muscles producing transient vibrations | ▪ **Valvular:** Closure of semilunar (aortic & pulmonary) valves<br>○ Over aortic area : S2 is single (A2 only heard)<br>○ Over pulmonary area : S2 is split (A2 followed by P2) |
| ❖ Site of maximum intensity : | |
| ▪ At the apex of the heart | ▪ Over base of the heart |
| ❖ Intensity: | |
| ☞ Causes of Accentuated S1: | ☞ Causes of Accentuated S2: |
| 1. MS - TS | |
| 2. Hyperdynamic circulation | 1. Hyperdynamic circulation |
| 3. Systemic hypertension | 2. ↑ A2 in systemic hypertension |
| 4. Short P-R interval (tachycardia nodal rhythm, Wolff–Parkinson–White syndrome (WPW) | 3. ↑ P2 in pulmonary hypertension |
| 5. Children & thin chest | 4. Children & thin chest |
| ☞ Causes of Weak (muffled) S1: | ☞ Causes of Weak (muffled) S2: |
| 1. MR - TR - calcified MS | 1. ↓ A2 in AS & AR |
| 2. Impaired myocardial contractility (HF, Myocardial infarction, myocarditis) | 2. ↓ P2 in PS & PR |
| 3. Hypotension | 3. Hypotension |
| 4. Long P-R interval (bradycardia, heart block) | |
| 5. Mechanical (causes of absent apex; see later) | 4. Mechanical: (causes of absent apex; see later) |
| ❖ N.B.: | |
| ➢ Causes of Variable SI intensity : due to variable P-R interval in:<br>○ AF<br>○ Extrasystoles<br>○ Complete heart block | ➢ Aortic component of S2 is heard all over heart (including apex) while Pulmonary component is heard over Pulmonary area only.<br>➢ In Pulmonary hypertension S2 is closely split<br>➢ Splitting of S2 : see later. |
| ➢ Cause of Splitting of S1 : right bundle branch block | |

## ❖ Splitting of Second heart sound :





- **Normally :** LV ejection period is shorter than that of RV , So A2 precedes P2

♥ هتحط السماعة على ال P.area هتسمع صوت واحد , قول للعيان ياخد نفس , هتلاقي الصوت اتقسم صوتين

- **Timing of A2 in relation to P2 :** depends on period of ejection of corresponding vessel

## ❖ Relation of splitting to respiration:

☠ **Splitting Is Only Detected Over Pulmonary Area as pulmonary component is weak** while aortic component is loud heard at both A & P areas

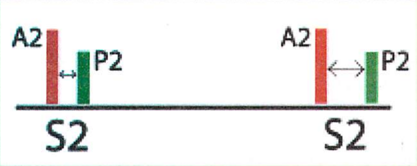
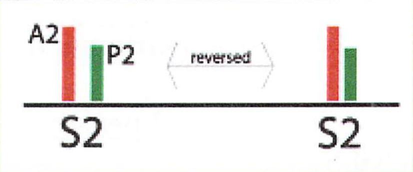
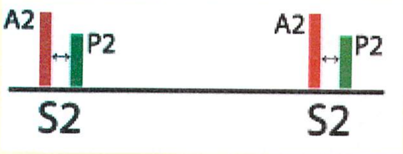
❖ **During inspiration :**

- ↑ VR will increase RV Load , with delayed closure of pulmonary valve.
- Meanwhile the lung is expanded & retains more blood in its vessels with decrease in LV load, and so earlier closure of Aortic valve

→ **So during inspiration → wide splitting of S2**

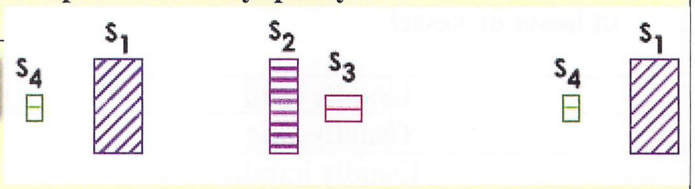
❖ **During expiration:** the reverse occurs → narrow splitting or fusion (single S2)

? **What are the causes of :**

| ❖ **Wide splitting Of S2:** “delay of pulmonary closure” | ❖ **Reversed “paradoxical” splitting:** “delay of aortic closure” | ❖ **Single S2** |
|---|---|---|
|  |  | ♥ هتحط السماعة على ال P.area هتسمع صوت واحد , قول للعيان ياخد نفس , هتسمع صوت واحد |
| ♥ هتحط السماعة على ال P.area هتسمع صوتين , قول للعيان ياخد نفس , هتلاقي الصوتين يبعدوا عن بعض أكتر | ♥ هتحط السماعة على ال P.area هتسمع صوت صوتين , قول للعيان ياخد نفس , هتلاقي الصوتين بقوا صوتواحد | |
| • Delayed P2 in PS | • Delayed A2 in AS | • Synchronous A2 & P2 : single ventricle defect |
| • RBBB | • LBBB | • Faint A2 (P2 only heard): AS<br>• Faint P2 (A2 only heard): PS (alone or with F4) |
| • VSD | • PDA | |
| • ASD | ❖ **Reversed splitting due to:**<br>• Delay of A2 to come after P2 → reversal of relation to respiration, i.e. Splitting closes during inspiration & widens during expiration | ❖ Closed narrow split:<br>• Pulmonary hypertension |
| ❖ Causes of wide fixed splitting of S2 : “unaffected by respiration” → ASD<br><br>♥ هتحط السماعة على ال P.area هتسمع صوتين , قول للعيان ياخد نفس , هتلاقي الصوتين زي ما هم لا يحدث اي تغير | | |

| 3. Third heart sounds, S3 | 4. Fourth heart sound, S4 |
|---|---|
| ❖ Time: | |
| ▪ Early diastole sound heard shortly after S2 best heard by the cone in left lateral position. | ▪ Late diastole (presystolic) sound heard just before S1 best heard by the cone in left lateral position. |
| ❖ Mechanism: | |
| ▪ Excess ventricular vibrations (blood gush in ventricle after opening of A-V valve) | ▪ Forcible atrial contraction against high ventricular end diastolic pressure |
| ❖ Causes of the sound: | |
| 1. Normal in children & young adult | 1. Normal in elderly person |
| 2. Volume overload in:<br>○ LV: MR, AR, VSD<br>○ RV: TR, PR, ASD<br>○ Hyperkinetic circulation | 2. Pressure overload in :<br>○ LV: systemic hypertension, AS<br>○ RV: pulmonary hypertension, PS |
| 3. Flabby myocardium in:<br>○ LVF (apical gallop)<br>○ RVF (tricuspid gallop)<br>○ Dilated cardiomyopathy | 3. Reduced compliance of ventricles in:<br>○ Myocardial infarction<br>○ Hypertrophic cardiomyopathy |

❖ Gallop rhythm “triple rhythm” صوت جري الحصان



❖ Definition: gallop = (S3 or S4 or Both) + tachycardia

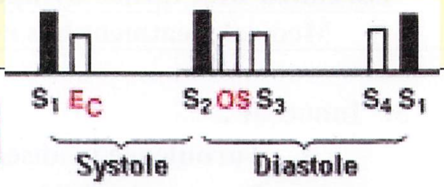
❖ Types :

A. Protodiastolic (ventricular) gallop = S3 + tachycardia

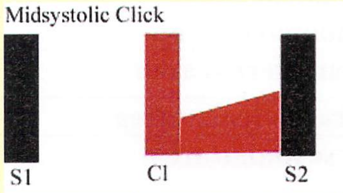
B. Presystolic (atrial) gallop = S4 + tachycardia

C. Summation gallop = S3 + S4 + tachycardia

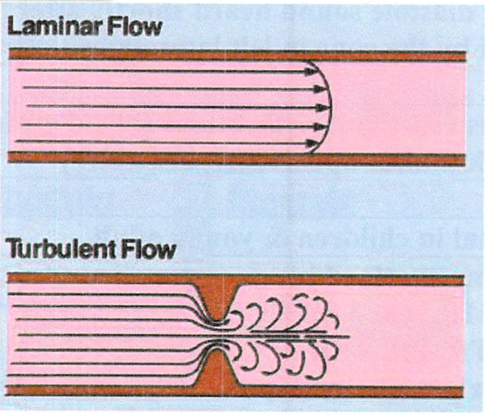
- Cause e.g. hypertensive heart failure



# II. Additional Heart sounds

| A. Systolic clicks | | B. Opening snap |
|---|---|---|
| 1. Early systolic = ejection click (E.C.) | 2. Mid & late systolic = mitral click | |
| ❖ Mechanism | | |
| ▪ Valvular E.C.: Opening of stenosed semilunar valve<br>▪ Vascular E.C.: Dilatation of the corresponding vessel | ▪ Upward prolapse of mitral leaflets into left atrium during systole. | ▪ Opening of stenosed A-V valves.<br>○ (stenosed valve with fibrosed rigid periphery and *pliable center*) |
| ❖ Identification: | | |
| ❖ Time: | | |
| ▪ Early systolic sound heard shortly after S1 | ▪ Mid to late systolic & it’s timing change with posture | ▪ Diastolic sound heard closely after S2 (separated from it by isometric relaxation phase) |
| ❖ Site of maximum intensity : | | |
| ▪ Aortic & pulmonary areas (base of the heart) | ▪ Apex | ▪ Midway between apex & left sternal border |
| ❖ Character : | | |
| ▪ *Sharp, high pitched,* clicky sound | ▪ *Sharp, high pitched,* clicky sound | ▪ *Sharp, high pitched,* snappy sound |
| ❖ Causes: | | |
| ☞ Aortic ejection click in:<br>▪ Valvular AS<br>▪ Systemic hypertension with aortic dilatation<br>☞ Pulmonary ejection click in:<br>▪ Valvular PS<br>▪ Pulmonary hypertension with pulmonary dilatation | ▪ Mitral valve prolapse “ click murmur syndrome”<br> | ▪ Organic MS or TS<br>❖ Significance :<br>▪ Diagnostic of organic MS<br>▪ Denotes mobile non-calcific leaflets with no regurge<br>▪ Assess the Severity of MS in inversely proportional to S2 – opening snap interval i.e. short interval → severe stenosis |
| ❖ Significance :<br>● The stenosis is valvular (never sub or supra valvular)<br>● The valve is non calcific. | | |

# III. Murmurs لغط



- ❖ **Definition :** musical sounds produced by turbulent blood flow
- ❖ **Mechanism:**
  1. Flow into a dilated chamber e.g. pulmonary dilatation
  2. Flow across a septal defect or a shunt
  3. Flow across a stenosed valve
  4. Regurgitant flow across an incompetent valve
  5. Increase amount or rate of blood flow; functional murmur
- ❖ **Synonyms:**

| | | |
|---|---|---|
| Over the heart :murmur | Over arteries : bruit | Over veins : hum |

- ❖ **Types of murmur:**

| 1. Organic murmur | 2. Functional = relative = flow murmur |
|---|---|
| • Caused by structure anatomical abnormality in heart or vessel | • Caused by functional (physiological) abnormality that increases the blood flow through a structurally normal heart i.e. relative stenosis |
| Usually loud | Usually faint |
| Usually long | Usually short |
| Usually harsh | Usually soft |
| May propagate to other areas | Localized |
| Associated with thrill + symptoms & signs | No thrill - no symptoms nor signs |
| Medical treatment has no effect | May disappear after treatment e.g. anemia |

3. **Innocent :**
   - Turbulence in absence of structural or physiological abnormalities ( i.e. No lesions at all)
   - It occurs in children & disappears as they grow

## ❖ In describing murmur , we comment upon the following items : SACT.R

1. Site of maximum intensity & Area of propagation
2. Character
3. Timing
4. Thrill & Grade
5. Type
6. Relation to position, respiration, exercise

## 1. Site of maximum intensity & Area of propagation

| ❖ Lesion | ❖ Site of maximum intensity | ❖ Area of propagation |
|---|---|---|
| MS | Mitral area; Apex | Localized |
| TS | Tricuspid area | Localized |
| MR | Mitral area; Apex | • If anterior leaflet :Axilla<br>• If posterior leaflet : back (left scapular region) & sternum |
| TR | Tricuspid area | Apex |
| AS | 1st aortic area | Apex & carotids |
| PS | Pulmonary area | Tricuspid area & may be under left clavicle |
| AR | 2nd aortic area | Apex |
| PR | Pulmonary area | Tricuspid Area |
| VSD | Left parasternal area | Whole precordium |
| PDA | Left infraclavicular area | Pulmonary area |
| Aortic coarctation | Inter scapular area | Anteriorly |

## 2. Character:

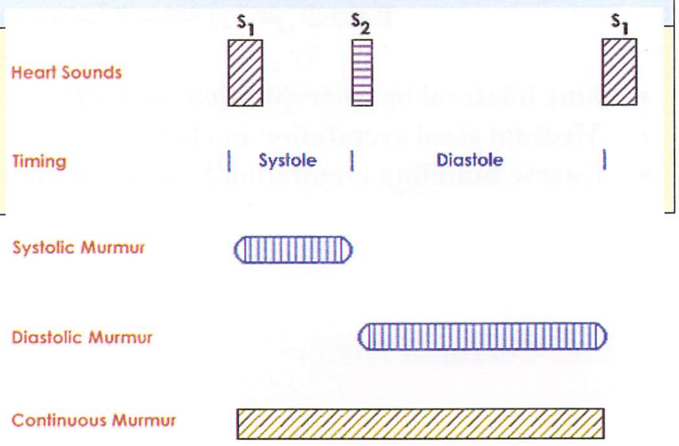
| | | | |
|---|---|---|---|
| ▪ **Soft** : all incompetent murmurs & flow murmurs | ▪ **Harsh:** VSD, COA & all stenotic murmurs except MS. | ▪ **Machinery:** PDA | ▪ **Rumbling:** MS & TS |
| ▪ **Musical "Sea-gull murmur"**: due to rupture of valve complex (cusps, chordea & papillary muscle), mostly due to endocarditis or ischemia. | | | |

## 3. Timing: timed against carotid pulse

| A. Systolic : | | | | B. Diastolic : | |
|---|---|---|---|---|---|
| ○ Early systolic | ○ Ejection systolic | ○ Late systolic | ○ Pan or holosystolic | ○ Early diastolic | ○ Mid & late diastolic |
| ▪ Very small VSD | ▪ AS<br>▪ PS | ▪ Mitral valve prolapse (MVP)<br>▪ Hypertrophic obstructive cardiomyopathy | ▪ MR<br>▪ TR<br>▪ VSD | ▪ AR<br>▪ PR: (Graham Steell murmur) | ▪ MS & TS<br>▪ Carey Coomb's murmur: (functional MS in RF) |

**C. Continuous; systolic & diastolic murmur :**

- Venous hum : jugular vein hum in the neck
- Arterio-venous fistula : systemic, pulmonary & coronary
- Patent Ductus Arteriosus (loudest in 2nd left interspace)
- Double valve lesion : AS/AR - MS/MR
- After Blalock-Taussig operation



## 4. Thrill & grade :

- ❖ Thrill is Palpable loud murmurs like sensation of purring cat
- ❖ Grade 4/6 at least.
- ❖ Due to organic & not functional valve disease.

| | | |
|---|---|---|
| ○ Stenotic murmurs are harsh + marked thrill | ○ Regurge murmurs are soft + minimal thrill | ○ Functional murmur : no thrill |

### ♥ Grades (intensity) of the murmur: Levine grading system e.g. Grade …/VI

1. Grade I : very faint- heard by an expert in optimum condition (quiet room-proper patient position)
2. Grade II : faint - heard by non-expert in optimum condition
3. Grade III : *moderate intensity* - easily heard but no thrill
4. Grade IV : loud with thrill يتسمع و السماعة لازقة كلها
5. Grade V : very loud - heard over wide area , with thrill يتسمع بحرف السماعة
6. Grade VI : extremely loud with thrill - be heard without stethoscope. يتسمع من بعيد

## 5. Type : organic or functional murmur (see before)

## 6. Relation to:

| A. Posture "Position" | B. Respiration | C. Exercise |
|---|---|---|
| ▪ Mitral murmurs : best heard in left lateral position | ▪ Right (tricuspid& pulmonary) Sided murmurs : ↑ by inspiration (Carvallo's sign) (due to ↑ VR → ↑ blood flow)<br>→ Carvallo's sign: differentiate between TR & MR | ▪ ↑ MS, MR. & AR |

### ♥ N.B.: Length of the murmur:

- Length of the murmur is related to the severity of the underlying lesion
- Organic murmurs are long while functional murmurs are short
- The loudness of the murmur is not related to the severity of the lesion

# IV. Other heart sounds

| 1. Pericardial rub | 2. Pericardial knock |
|---|---|
| ▪ **Cause :** Pericarditis | ▪ **Cause :**Constrictive pericarditis |
| ❖ Character | |
| • Superficial leathery continuous sound<br>• Site: Best heard at left sternal line over bare area & patient is sitting & leaning forward.<br>♥ تقعد العيان , وتخلي العيان يميل لقدام وسماعتك على ال Left sternal border<br>♥ دوس جامد على السماعة وقول للعيان وقف نفس<br>• DD from friction with the skin دوس جامد : Pericardial rub Increased by pressing stethoscope against chest wall<br>• DD from pleurisy وقف نفس : Pericardial rub does not disappear on holding up respiration | • Heard at same time of S3<br>• Sudden halting of relaxing ventricles by rigid pericardium |
| **3. Crepitations :** | **4. Metallic click :** |
| ♥ تقعد العيان على السرير , يرفع الهدوم وتحط السماعة ورا على ال Base<br>♥ تقول للعيان انهج وبعدها كحح , وبعدين كمل سمع<br>• Fine bilateral basal crepitations in LVF<br>• Medium sized crepitation in chest infection<br>• Coarse bubbling crepitation in acute pulmonary edema | Metal prosthesis = Metallic sound |

# CARDIAC HISTORY

## A. Personal History

| | | |
|---|---|---|
| 1. **N**ame: الإسم ثلاثي | 2. **A**ge:<br>○ Young : congenital heart disease<br>○ Middle to old : coronary congenital heart disease | 3. **S**ex :<br>○ Females : MS, rheumatic chorea<br>○ Males : MR, coronary heart disease |
| 4. **O**ccupation:<br>○ Stressful job : coronary heart disease, hypertension | 5. **M**arriage: recent delivery for DVT & pulmonary embolism<br>6. **M**enstrual history if female. | 7. **R**esidence & address: rheumatic fever is common in rural areas & low social level |
| 8. **H**abits of medical importance:<br>1. Cigarette smoking : coronary heart disease, arrhythmia<br>2. Alcohol : alcoholic cardiomyopathy<br>3. IV addicts : fungal & staph acute bacterial endocarditis | | 9. **H**andedness. |

## B. Complaint + duration: إي اللي جابك المستشفى ؟

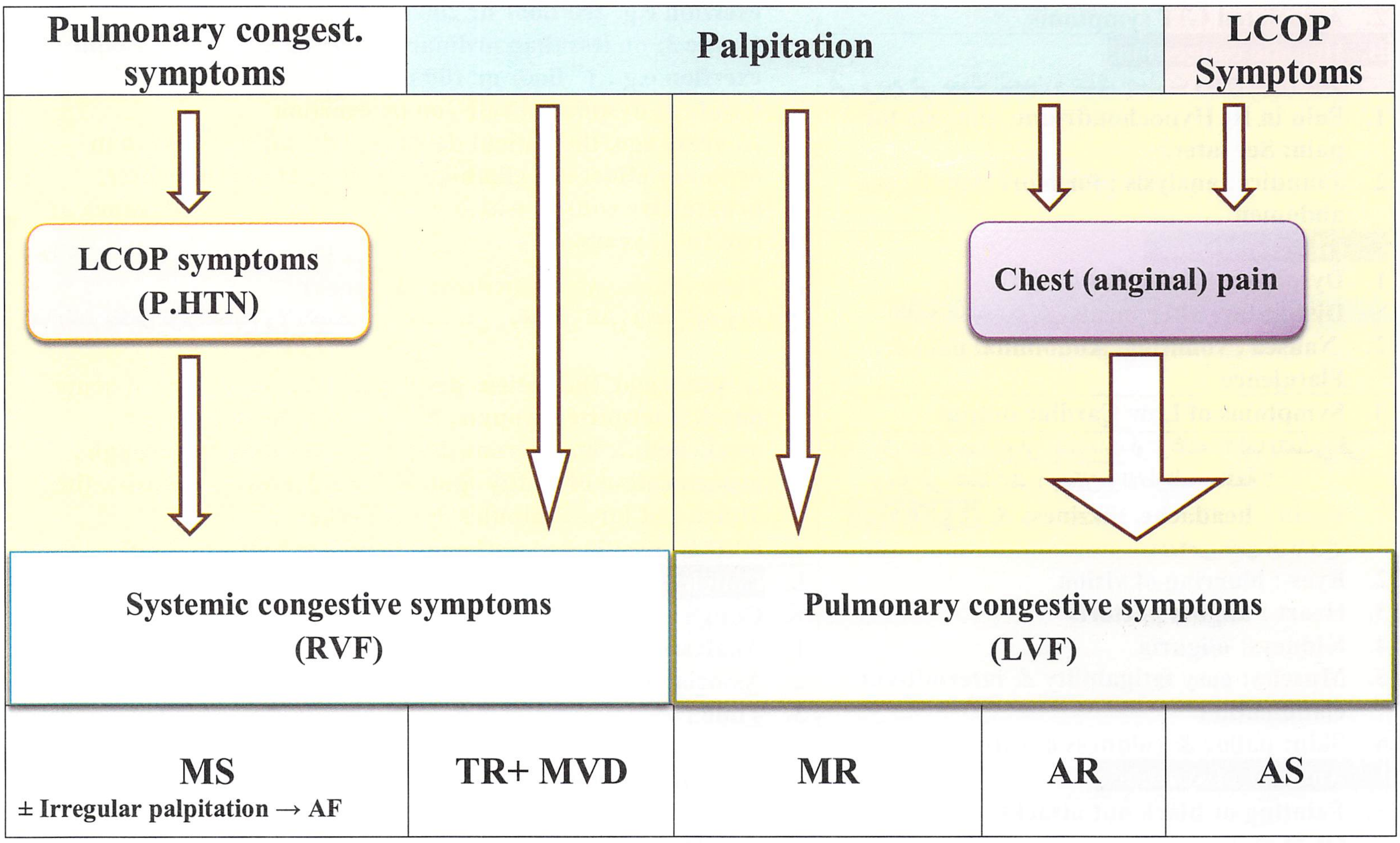
❖ Common complaints :

| | | | |
|---|---|---|---|
| ▪ Shortness of breath. | ▪ Awareness of heart beats. | ▪ Chest pain, fainting , easy fatigability | ▪ Lower limb swelling. |

## C. History of present illness = HPI المرض بدأ معاك إزاي , آخر مرة كنت كويس فيها إمتى ؟

| | |
|---|---|
| 1. Symptoms of systemic **C**ongestion indicating right side heart failure (TR) | 2. Symptoms of Pulmonary **C**ongestion indicating left side heart failure (Mitral Valve Disease = MVD) |
| 3. Symptoms of Low **C**ardiac out put | 4. Symptoms of **C**ongenital heart disease |
| 5. Chest **P**ain (Ischemic pain; Angina) | 6. **P**ressure symptoms |
| 7. **P**alpitation | 8. **P**yrexia (fever) |
| 9. Symptoms of increased **B**lood pressure (Hypertension) | 10. Symptoms of occlusion of **B**lood vessels (systemic embolization) |
| 11. Investigations & treatment received | 12. Symptoms of other systems |

## Algorithm of Cardiac History For Diagnosis


Pulmonary congest. symptoms
Palpitation
LCOP Symptoms
LCOP symptoms (P.HTN)
Chest (anginal) pain
Systemic congestive symptoms (RVF)
Pulmonary congestive symptoms (LVF)
MS
± Irregular palpitation → AF
TR+ MVD
MR
AR
AS

❖ N.B.:

- Double mitral : regular palpitation on top of pulmonary congestion symptoms
- Irregular palpitation → AF → MVD (MS > MR) or double mitral lesion.

❖ N.B.:

| | |
|---|---|
| تتكتب في ال **complaint** بكلام العيان | |
| تتكتب في **H/O of present illness** عادي | |

## 1. Symptoms of systemic Congestion indicating right side heart failure

**A. Lower limb edema** ? رجلك اتنفخت او ورمت

✍ **LL swelling:, analysis:**

1. Onset, Course, Duration (OCD), what increase (↑), what decrease (↓)
2. Relation to Ascites : onset before or after LL edema
3. Pitting or no؟ الشراب بيعلم ولا لأ
4. Painless or painful
   لما بتدوس على الورم بيوجعك ولا لأ ؟
5. Laterality (Unilateral or Bilateral)
6. Level (extent)

**A. Ascites** ? بطنك نفخت او ورمت

✍ **Abdominal distension :**

1. Relation to LL edema: onset before or after Ascites
2. Associated GIT symptoms

**B. Hepatic congestion:**

في وجع في جنبك اليمين وعينك اصفرت ولون البول اتغير ?

1. Pain in Rt Hypochondrium: analysis for pain: See later.
2. Jaundice; analysis : for more details; see abdomen

**C. GIT congestion :**

1. Dyspepsia ؟ الأكل "اللقمة" بيتعبك

✍ **Discomfort after meals** اللقمة ما بتريحنيش

2. Nausea , vomiting, Abdominal pain & Flatulence

## 3. Symptoms of Low Cardiac output

❖ هل عندك صداع أو اغماءات أو زغلله ؟ لما بتمشي في وجع في عضلاتك ؟ بهتان والأطراف ساقعة ؟

1. Brain : headache, dizziness & **SYNCOPE**
   بيغمى علي أو بدوخ
2. Eyes : blurring of vision
3. Heart : angina pectoris
4. Kidneys: oliguria
5. Muscles: easy fatigability & intermittent claudication
6. Skin: pallor & coldness of extremities

**❖ Analysis of syncope :**

✍ **Fainting or black out attacks**

- ○ OCD, ↑, ↓.
- ○ Associated symptoms (pre or post) هل معاها:
  - Palpitation (analyze), بتبقى حاسس بضربات قلبك أو حاسس برفرفة على صدرك؟
  - Chest pain (analyze), وجع في صدرك
  - Cold extremities جسمك بيسقع
  - Sweating عرق , etc….
- ○ Type of syncope مع المجهود ولا بدون مجهود : at rest or *exertion* (during or after exercise)
- ○ Time of the attack بتستمر اد اي
- ○ Recovery : *spontaneous* or with intervention بتفوق لوحدك ولا لازم حد يفوقك
- ○ Frequency of attack جتلك كام مرة
- ○ With convulsion (to exclude neurological cases) or not?؟ اتشنجت
- ○ With cyanosis (to exclude F4) or not?
  ازرقيت ؟

## 2. Symptoms of Pulmonary Congestion indicating left side heart failure

**a. Dyspnea** هل عندك كرشة نفس , نهجان؟

✍ **(shortness of breath):, analysis:**

1. OCD. ↑, ↓.
2. Associated symptoms e.g. palpitation, chest pain & wheezes
   هل مع كرشة النفس فيه وجع او رفرفة اوصدرك بيزيق ؟
3. Relation to :

a) Position (orthopnea; using extra pillows)
في وضع معين بتنام فيه ؟ بتنام على كام مخدة ؟

✍ The patient had orthopnea; he must sleep on … pillows.

b) Exertion (on effort) & it's grade (usually grade 3) :
بتحصل مع المجهود زي طلوع السلم أو الشغل أو الجري ؟

Grade 1: Not more than ordinary effort i.e. dyspnea on severe exertion e.g. 3rd floor or 300 m.
Grade 2: on ordinary effort i.e. dyspnea on moderate exertion e.g. 2rd floor or 200 m.
Grade 3: on less than ordinary effort i.e. dyspnea on mild exertion e.g.: 1st floor or 100 m.
Grade 4: dyspnea at rest , on no exertion

✍ … years ago, the patient developed dyspnea on less than ordinary effort e.g. climbing 1st floor , of gradual onset, progressive course, which progressed to become dyspnea at rest in … years.

c) Time (Paroxysmal nocturnal dyspnea)
لما بتنام بتكمل نوم للصبح ولا بتصحى؟ ولو بتصحى , بتصحى امتى وعلى ايه ,وبتروح ازاي؟

✍ … years ago, the patient developed attacks of PND of acute onset, intermittent course, from which the patient is awakened … hours from sleep, on sever dyspnea , cough , expectoration of frothy sputum ( ± wheezes ± cyanosis), the attack last for … minutes & then relieved by ….

- PND is specific and pathognomonic for Left sided HF.

**b. Cough :**

✍ **Cough**

1. Analysis : OCD, ↑, ↓ , (ATP)
2. Associated symptoms e.g. wheezes , toxemia
3. Time :
   - ○ 1 – 2 hours after sleep i.e. *nocturnal* (cardiac asthma)
   - ○ Early in the morning (Bronchial Asthma; BA)
4. Type :
   - ○ Continuous ؟ هل الكحة ديه مستمرة طول الوقت
   - ○ Paroxysmal ؟ ولا في صورة نوبات : بتيجي وتروح : متقطعة
5. Relation to Position & exertion (cardiac cough: ↑*on lying flat & exertional*) هل الكحة بتزيد مع المجهود ولا لأ ؟
   في وضع معين بيزود الكحة ؟ هل الكحة ببلغم ولا كحة ناشفة ؟
6. *Dry (but maybe whitish sputum)* ناشفة or Productive (Expectoration) ببلغم; If productive; analyze (see chest).

**c. Hemoptysis** هل بتكح دم او بتكح بلغم معرق بدم؟

✍ **(Coughing of blood)** : For more details about analysis see chest.

- ▪ OCD, ↑, ↓
- ▪ A: Attack : number, date, before the attack…, during the attack…, after the attack …,
- ▪ B: Blood : amount, content, color
- ▪ C: Circulatory compensation : hospital admission, blood transfusion
- ▪ D: Dysfunction : Disturbed conscious level, bleeding from other orifices

**d. Recurrent Chest infection** ؟ في التهابات على الصدر بشكل متكرر

- ○ Fever, productive cough with (yellowish or greenish) sputum, possible culture & sensitivity & antibiotic use.

### 4. Symptoms of Congenital heart disease

**A. Cyanotic group:** شفايفك بتزرق– ضوافرك بتزرق ؟

- **Age of onset:**
  - **Since birth** : TGA
  - **Shortly after birth** : F4
  - **Few years(3-10) after birth** : F3
  - **In teenager** : Eisenminger's
- **Type :** central, peripheral, differential
- **Cyanotic spells** relieved by squatting in F4
- **Associated congenital anomaly** e.g. polydactyl

**B. Acyanotic group** : winter bronchitis & exertional cyanosis in Left to Right shunt

❖ **IF –VE :** No symptoms suggestive of congenital HD (late onset of complaint, no cyanosis, -ve consanguinity)

### 5. Pressure symptoms:

هل صوتك اتنبح,هل عندك صعوبة في البلع?

- **Dysphonia** (Hoarseness of voice) : pressure on left recurrent laryngeal nerve
- **Dysphagia** (difficultly in swallowing) : pressure on esophagus
- **Dyspnea & cough** : pressure on tracheobronchial tree

❖ **IF –VE :** no symptoms suggestive of pressure manifestations e.g. Hoarseness of voice, dysphagia

### 6. Chest Pain

هل عندك وجع في صدرك

- ❖ Usually in Aortic valve disease & ischemic heart diseases; anginal pain
- ❖ ***Analysis of any Pain at any site as following:***
- OCD, ↑, ↓, Associated symptoms
- **Character** الوجع ده شكله اي: e.g. compression ضغطة, burning حرقان , heaviness ثقل , stitching نَغز أو شكشكة
- **Site** مكان الوجع ده فين
- **Radiation** هل بيسمع في حته تاني
- **Relation to** هل له علاقة ب (meal, respiration, exertion, postural)
- ❖ **IF –VE :** no chest pain detected by the patient

### 7. Palpitation رفرفة , هل حاسس بضربات قلبك ؟

- ✍ (awareness of heart beats)
- ❖ Usually in AR or MR cases
- ❖ **Analysis :**
- OCD, ↑, ↓
- **Rhythm: Regular or irregular** منتظمة ولا غير منتظمة
- **At Rest or with exertion** بدون مجهود ولا مع المجهود
- **Rate: Rapid (tachy) or slow (brady)** سريعة ولا بطيئة

### 8. Symptoms of increased Blood pressure:

➢ **If patient knows :**

- The patient is not hypertensive
- The patient is known to be hypertensive … years on … medication

➢ **If patient does not know :**

**Ask about Hypertension indirectly:** في وش في ودانك وصداع وزغللة ؟

- Headache, Blurring of vision Tinnitus , Epistaxis

### 9. Pyrexia (Fever)؟ هل سخنت

- OC(type)D
- Associated symptoms e.g. rigors رعشة
- History of drug intake
- ❖ **IF –VE :** No recurrent fever detected by the patient

### 10. Symptoms of occlusion of Blood vessels (systemic embolization)

هل حصل تقل في لسانك أو ايدك أو رجلك ؟

- **Weakness** : embolization of middle cerebellar artery
- **Chest pain** : embolization of coronary artery
- **Bleeding in urine** : embolization of renal artery
- **Pain in left hypochondrium** : embolization of splenic artery
- ❖ **IF –VE :** No symptoms suggestive of systemic embolization

### 11. Investigation & treatment received

عملت فحوصات اي ؟ واخدت علاج اي?

- ❖ **Cardiac Investigations e.g.**
  - ECG, Echocardiography, coronary angiography, thallium.
- ❖ **Non cardiac investigation e.g.**
  - Blood sugar
  - Lipid profile
  - Blood cultures
- ❖ **Treatment received e.g.**
  - Digitalis, Diuretics
  - Anticoagulation
  - Long acting penicillin

### 12. Symptoms of other systems e.g. chest, GIT, neurology

هل عندك مشاكل تانية في جسمك ؟ وتاخد كل سيستم وتسأل العيان على الأعراض الكبيرة اللي فيه بسرعة أوي

## D. Past history as usual but focus on rheumatic fever

| | | |
|---|---|---|
| • Since … | • Manifested by … | • Investigated by … |
| • Treatment … & it's effect … | • Continued or not | • Recurrence or not |
| • Recurrent tonsillitis , pharyngitis , fever, arthritis | • Intake of anti-inflammatory (aspirin & steroid) | • Tests for allergy with injection<br>• IM injection of long acting penicillin; monthly. |

## E. Family history as usual & asked for congenital heart disease or rheumatic heart disease.

# General Examination Of Cardiac Case

❖ Examination as general examination but stress on the following:

## I. Vital signs

| ❖ Temperature | ❖ Pulse | ❖ Blood pressure | ❖ Respiratory rate |
|---|---|---|---|
| See below | Regular or irregular (AF) | Hill's sign of AR | Tachypnea in LSHF |
| | Peripheral signs of AR in lower limbs | | |

### ☠ What are the Causes of fever in a cardiac case?

| 1. Endocardial | 2. Myocardial | 3. Pericardial | 4. Pulmonary | 5. Others |
|---|---|---|---|---|
| ▪ Rheumatic fever or activity<br>▪ SBE | ▪ Acute Myocardial infarction<br>▪ Myocarditis | ▪ Acute pericarditis | ▪ Pulmonary infarction<br>▪ Pulmonary infection | ▪ DVT<br>▪ Associated fevers |

## II. General overview

| A. Appearance | B. Built | C. Consciousness | C. Colors | D. Decubitus | E. Expression |
|---|---|---|---|---|---|
| ▪ Looks ill & toxic in SBE | ▪ Under built: cardiac cachexia<br>▪ Over built: Pickwickian syndrome → cor-pulmonale | ▪ DCL: in hypertensive encephalopathy<br>▪ Cardiac causes of syncope e.g. AS | ▪ Jaundice<br>▪ Cyanosis<br>▪ Pallor | ▪ Orthopnea in severe HF<br>▪ Prayer's position : pericardial effusion | ▪ According to the case e.g. Mongol in Down syndrome : VSD |

### ☠ What are the Causes of … in cardiac case ?

| ❖ Jaundice | ❖ Cyanosis | ❖ Pallor |
|---|---|---|
| 1. **Associated :** the commonest caues e.g. viral hepatitis<br>2. **Hemolytic jaundice.** : in pulmonary infarction, hemolysis on artificial valves<br>3. **Hepatocellular jaundice :** in marked hepatic congestion (cardiac cirrhosis) due to severe right sided HF , pericardial effusion , TS & TR.<br>4. **Obstructive jaundice :** in marked hepatic congestion→ compression of bile & inspissation of bile in canalicular lumen | 1. **Central :** in cyanotic congenital HD as F4 , or advanced HF<br>2. **Peripheral** in low CO<br>3. **Differential** in PDA | 1. Anemia<br>2. Rheumatic activity<br>3. Infective endocarditis<br>4. Low cardiac output<br>5. shock |

## III. Systemic overview :

| ❖ Head | ❖ Neck | ❖ Upper limb | ❖ LL |
|---|---|---|---|
| ▪ **Puffy eye lids** in edema (Heart failure)<br>▪ **Nose &cheeks:** malar flush of MS<br>▪ **De Musset's sign of AR**<br>▪ **Conjunctiva :** pallor & petechial hemorrhage in SBE | ▪ **Congested Neck veins :**<br>○ Pulsating in congestive HF<br>○ Non pulsating in pericardial effusion<br>▪ **Carotid arteries :** thrill in AR & AS<br>▪ **Peripheral signs of AR** in the neck | ▪ **Nails :**<br>○ clubbing:<br>- Infective endocarditis (pale clubbing)<br>- Congenital Cyanotic heart disease (cyanotic clubbing)<br>○ splinter hemorrhage in SBE<br>▪ **Nodules :**<br>○ SC in Rh. fever<br>○ Osler's nodes in SBE<br>▪ **Peripheral signs of AR in UL** | ▪ **Edema** in HF, pericardial disease<br>▪ **Peripheral signs of AR** in LL |

## IV. Other systems except that of local exam :

| ❖ Chest examination | ❖ Abdominal examination | ❖ Neurological examination |
|---|---|---|
| ▪ As a cause :<br>○ Cor-pulmonale<br>▪ As a result :<br>○ Crepitations due to LVF & pulmonary oedema<br>○ Chest infection due to pulmonary congestion<br>○ Pleural effusion due to congestive heart failure<br>○ Lung collapse due to pericardial effusion (Ewart's sigs)<br>▪ As an association :<br>○ Dextrocardia in Kartagener's syndrome | ▪ Liver:<br>○ Enlarged & tender in : RVF, pericardial disease<br>○ Enlarged, tender with expansile pulsation : TR,TS<br>○ Enlarged firm with sharp border : cardiac cirrhosis<br>▪ Spleen:<br>○ Enlarged in RVF, pericardial disease, infective endocarditis , portal hypertension in cardiac cirrhosis<br>▪ Ascites:<br>○ Ascites after edema in RVF<br>○ Ascites precox in TR, TS, pericardial diseases | ▪ As a cause:<br>○ Autonomic neuropathy of the heart may cause silent myocardial infarction<br>▪ As a result :<br>○ Hemiplegia (embolic, thrombotic or hemorrhagic)<br>▪ As association :<br>○ Friedreich ataxia, Duchenne's myopathy, Rheumatic Chorea |

| Values of back examination in cardiac case | | |
|---|---|---|
| ▪ Murmurs & Bruit:<br>○ MR : left scapular region<br>○ Coarctation of aorta : interscapular region<br>○ Bruit of renal artery stenosis in renal angle | ▪ Crepitations:<br>○ Fine Bilateral basal crepitation : LVF<br>○ Medium sized crepitation in chest infection<br>○ Coarse Bubbling crepitations : acute pulmonary edema<br>▪ Ewart's sign : collapse of left lower lobe in pericardial effusion | ▪ Vertebrae- Scapula :<br>○ Spina bifida : associated congenital anomaly in congenital HD<br>○ In ankylosing spondylitis: Low back pain, stiffness & limited spine mobility associated with AR<br>○ In coarctation of aorta: anastomosis around scapula in<br>▪ Skin:<br>○ Cafe' au lait patches in neurofibromatosis associated with pheochromocytoma & IHSS |

# Local Examination Of Cardiac Case

**Rules :**

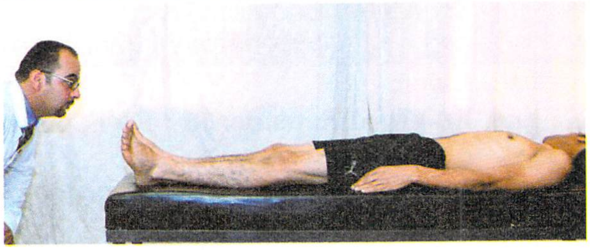
1. Good light
2. Exposure the patient's chest from umbilicus upwards.
3. Position of the patient supine with the head of the table slightly flexed
4. Always examine from the patient's right side
5. Make sure that the patient is comfortable in this position

**Examination:**

| | | |
|---|---|---|
| I. Combined inspection & palpation | II. Percussion | III. Auscultation |

# I. Combined Inspection & palpation

## 1) Precordial bulge



❖ **Definition :** area of the chest overlying the heart (from the 2nd to 6th costal cartilage, from left sternal border to MCL)

♥ طريقة الفحص: من عند حرف السرير وابص Tangential مع ملاحظة مقارنة ناحيتي الصدر ببعض

❖ **Causes :** RV enlargement since early childhood due to Rheumatic HD or Congenital HD, & very rarely due to pericardial effusion

## 2) Veins & Scars

❖ **Dilated veins :** SVC obstruction (Filling upwards downwards)

❖ **Scars :** name , healing (1ry intention : clean linear healing, 2ry intention : pigmentation , keloid)

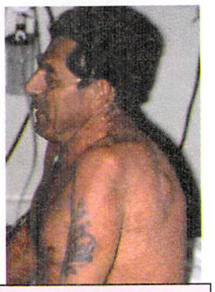
○ Median sternotomy scar: open heart surgery e.g. valve replacement

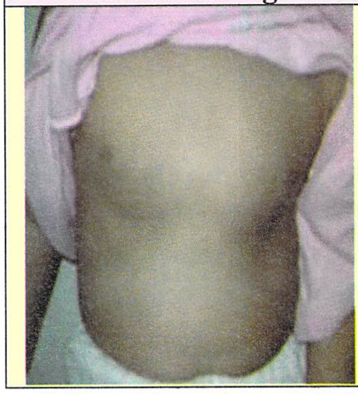
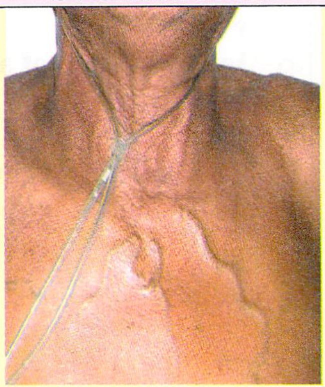
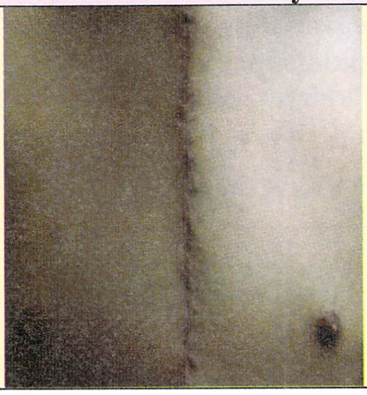
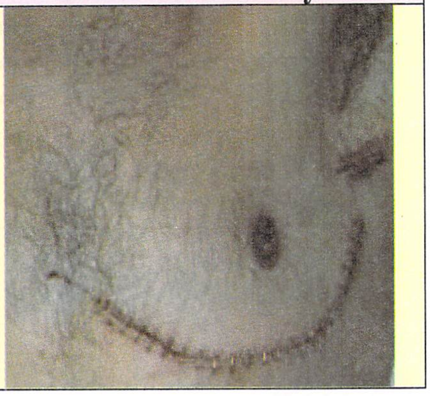
○ Lateral thoracotomy (inframammary) scar: closed heart surgery e.g. mitral valvotomy

## 3) Shape of the chest

- E.g. barrel shaped chest : for more details see chest chapter

Barrel shaped chest →



| ▪ Precordial bulge | ▪ SVC obstruction | ▪ Median sternotomy scar | ▪ Lateral thoracotomy scar |
|---|---|---|---|
|  |  |  |  |

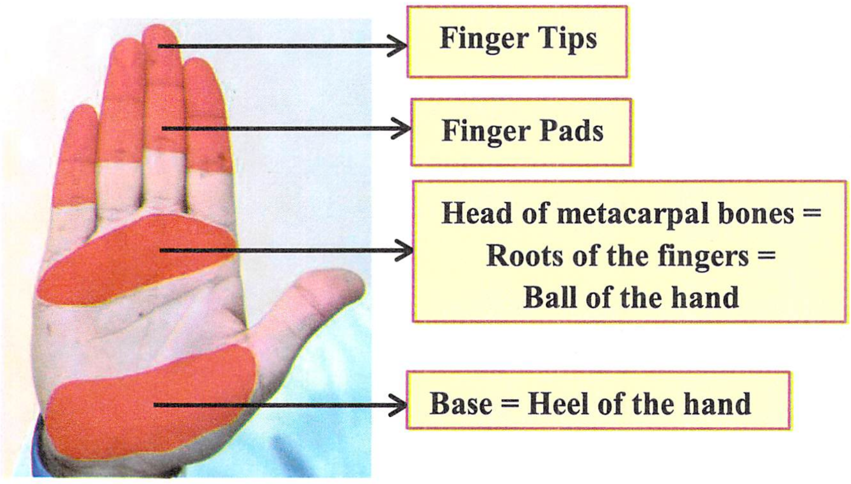
## 4) Pulsations لازم وقف نفسك في أي:

1) Apex
2) Suprasternal pulsation
3) 1st aortic area
4) Pulmonary area
5) Left parasternal pulsation
6) Right parasternal pulsation

☠ **IF YOU PRESS, YOU MISS**

☠ لو ضغطت ع النبض اوي مش هتحسه صح اوي

❖ Parts of the hand used in palpation:


Finger Tips
Finger Pads
Head of metacarpal bones = Roots of the fingers = Ball of the hand
Base = Heel of the hand

## 1. Apex :

❖ Comment on SACT.R

- ❖ **Definition:** outermost lowermost visible, strongest palpable pulsation point over the chest wall
- ❖ **Technique of examination:**

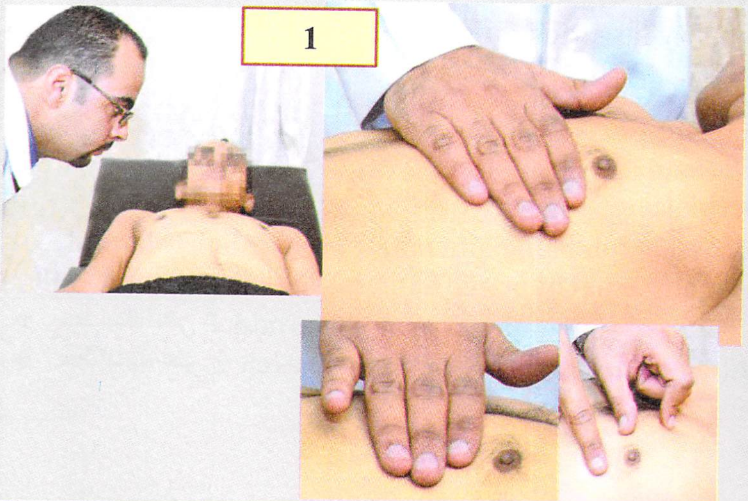
### 1. Site: patient in supine position, inspection to be confirmed by palpation

ابص tangentially على ال Puls. والعيان موقف نفسه , لو شايفها وواضحة ←
تحط عليها كافة ايديك اليمين finger pads (palmer surface of fingers) ← بعدين احدد اوضح Puls. بكذا صابع (finger tips) ←
بصابع واحد (tip of index finger) ← اعد بالايد التانية بعد تحديد ال angle of Louis ← ال space اللي قصادها هو ال 2nd space

لو Puls. مش شايفها ومش واضحة ← حط كافة ايديك اليمين في ال posterior axillary line وارجع بيها لمكان الأناتومي بتاع ال apex في
محاولة انك تحسها ← بعدين احدد اوضح Puls. بكذا صابع ← بصابع واحد ← اعد بالايد التانية

لو Puls. مش محسوسة في الوضع السابق ونته حاطط إيدك ← قول للعيان ينام على جنبه الشمال Left lateral ← لما تحس ال puls. ← حدد
اوضح Puls. بكذا صابع ← بصابع واحد ← رجع العيان supine ← ورجع ايدك حوالي 2 cm ← اعد بالايد التانية

لو محستهاش ← Impalpable apex = invisible apex = absent apex ( أسبابها مهمة أوي )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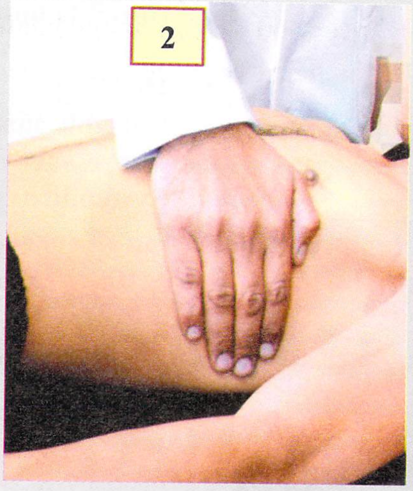
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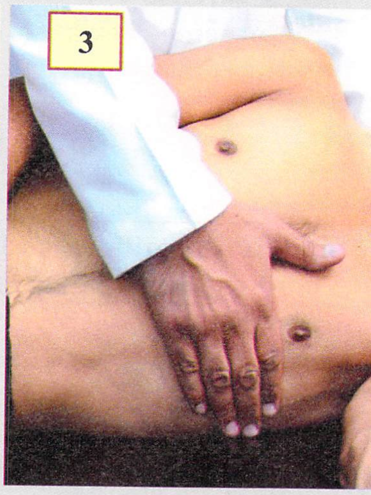
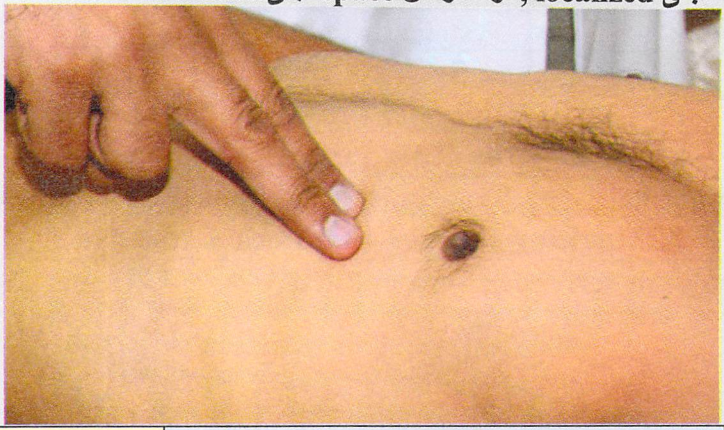

3

| ✓ **Normally** | ☠ **Abnormally:** | |
|---|---|---|
| - **In adult :** localized in left 5th space just inside MCL in supine position<br>- **In children** in left 4th space in MCL | - **LV enlargement:** shifted outwards & downwards | - **RV enlargement :** shifted outwards |

### 2. Area = extent = size: patient in supine position, inspection to be confirmed by palpation

- العيان نايم supine ← ابحث عن ال apex ← ثم تضع عليها صباعين لو غطوا ال apex تبقى localized , لو لسه تبقى diffuse
- لو ال Pulsation في space واحدة تبقى localized , لو أكثر من space تبقى diffuse



| | | |
|---|---|---|
| - Localized (One space, ≤ 3 cm i.e. well defined) | - **LV enlargement :** Localized (One space, ≤ 3 cm i.e. well defined) | - **RV enlargement :** diffuse (More than one space, > 3 cm i.e. ill defined) |

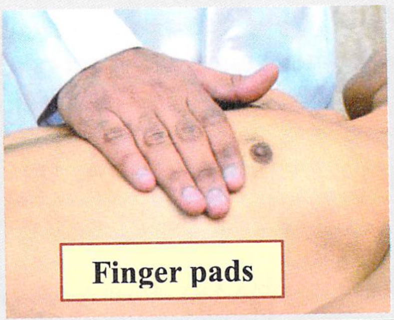
## 3. Character: patient in supine position, by palpation only.

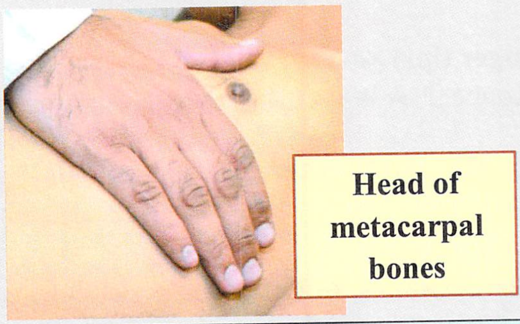
- ♥ بص على ال apex ← حط ايديك عليها
- ♥ استخدم ال finger pads علشان تحس ال :

| | | |
|---|---|---|
| ▪ Normal | ▪ Hyperdynamic | ▪ Heaving |

- ♥ ثم استخدم ال head of metacarpal bones علشان تحس ال slapping apex

- Left lateral position NOT preferred to determine the character of the apex as it increases the apical pulsation and so misleading the original character.

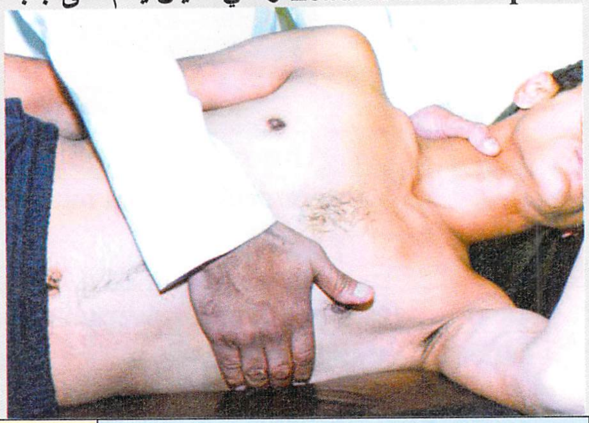




| | | |
|---|---|---|
| ❖ **Gentle non sustained tap** formed by left ventricle, felt by the tips of finger on supine position then left lateral side | ❖ **LV enlargement : "forcible stronger than normal" :**<br>▪ **Hyperdynamic:** (forcible non sustained قوية وبتجري) in volume overload e.g. MR, AR.<br>▪ **Heaving:** (forcible sustained قوية وبتطول ) in pressure overload e.g. AS, VSD, Systemic hypertension | ❖ **RV enlargement:**<br>▪ Tapping (weak)<br>▪ Slapping apex (weak apex + palpable S1) in MS |

## 4. Timing with carotid by inspection & Thrill (organic lesion, palpable murmur): patient in left lateral position, by palpation only by the palm over the head of metacarpal bones & hand is moulded on chest wall

- ♥ حط ايدك على ال carotid علشان تعمل timing
- ♥ حط ايديك على ال mitral area بال head of metacarpal bones وخلي العيان ينام على جنبه الشمال علشان تزود ال Thrill



| | | |
|---|---|---|
| ▪ No thrill | ▪ Systolic thrill in MR (20%) | ▪ Diastolic thrill in MS (80%) |

## 5. Rhythm :

| | |
|---|---|
| ▪ Regular | ▪ Irregular ( AF or multiple Extrasystole) |

## 6. Rate (apical) :

| | |
|---|---|
| ▪ Not usually done apically in normal | ▪ Done in irregularity to determine pulsus deficit |

## 7. Rocking : named after Rock & Roll dance

- ♥ ايدك على ال carotid وعينيك على ال apex وشوف مع طلعة ال carotid يوجد bulge or retraction وحدد RV or LV

| | |
|---|---|
| • Left or internal rocking (LVE):<br>○ Systolic bulge with left parasternal retraction; anti-clock wise rotation | ▪ Right or external rocking (RVE):<br>○ Systolic retraction with left parasternal bulge; clock wise rotation |

❖ **N.B.: Other abnormalities of the Site of the apex:**

### 1) Upward displacement:

A. **Supradiaphragmatic** : collapse or fibrosis in upper lobe of Lt lung.
B. **Diaphragmatic** : paralysis of Lt copula of diaphragm.
C. **Infradiaphragmatic** : tense ascites, tumors & pregnancy

### 2) Downward displacement:

- Thin individuals with long chest , Emphysema "COPD" & Visceroptosis.

### 3) Inward "to the Rt." displacement:

- **Cardiac causes** : congenital dextrocardia
- **Lung causes** :
- Right sided fibrosis & collapse
- Left sided pleural effusion & pneumothorax

### 4) Outward "to the Lt." displacement:

A. **Cardiac causes** : RV enlargement
B. **Lung causes:**
- Left sided fibrosis & collapse
- Right sided pleural effusion & pneumothorax.

### 5) Outward & downward displacement:

- LV enlargement

### 6) Double apex :

- **Ventricular aneurysm** :systolic – diastolic pulsation (paradoxical)
- **Hypertrophic cardiomyopathy** : systolic – systolic pulsation

### 7) Impalpable apex "invisible apex" "absent apex":

A. **Cardiac :**
- Pericardial effusion, constrictive pericarditis
- Weak contraction (myocardial infarction)
- Dextrocardia

B. **Chest causes :**
- Obesity, behind a rib
- Emphysema, left sided pneumothorax or Pleural effusion

| ◆ Area | 2. Suprasternal | 3. 1st Aortic Area | 4. Pulmonary Area | 5. Right Parasternal | 6. Left Parasternal |
|---|---|---|---|---|---|
| ◆ Site | ▪ In suprasternal notch just above manubrium sterni | ▪ Right 2nd space within right parasternal line | ▪ Left 2nd space within left parasternal line | ▪ 3rd & 4th right spaces within right PSL | ▪ 3rd & 4th left spaces within left ParaSternal Line |
| ◆ Inspection | ▪ Look on suprasternal notch tangentially والعيان نايم أو قاعد | ▪ Look tangentially while asking the patient to hold breath | | | |
| ◆ Pulsation palpated by | ▪ By tip of the index & middle finger perpendicular to suprasternal notch while the patient holding his breath in semi sitting position | ▪ Placing the tips of the curved middle three fingers in the (aortic or pulmonary) area while the patient is holding breath<br>♥ حدد ال space وبعد كده تحس ال .Puls بال tips | | ▪ Pulsation palpated by base of hand (increased with expiration) with extended elbow, wrist & fingers<br>♥ قول للعيان يخرج نفس ويكتمه | |
| ◆ Causes of pulsation; Source | ▪ Normal in thin people.<br>▪ Abnormally in same causes of big pulse volume | ▪ Aortic dilatation or systemic hypertension | ▪ Pulmonary artery dilatation or pulmonary hypertension | ▪ Right atrium enlargement<br>▪ Huge Left atrium | ▪ Right Ventricle enlargement<br>▪ Huge Left atrium |
| ◆ Thrill by: by roots of fingers<br>◆ Timing against carotid pulse | ❖ In neck "carotids" :<br>▪ Propagated from heart base : AS accompanied by thrill over heart base<br>▪ Initiated in carotid itself "carotid shudder": AR, no thrill over heart base. | ○ AS (systolic + propagated to neck), thrill increases in leaning forward position & expiration<br>♥ يميل للأمام ويخرج نفسه ويكتمه<br>○ Continuous : PDA | ○ PS (systolic)<br>○ Continuous : PDA | | ○ VSD (systolic) |
| ◆ Others | ❖ Oliver's sign or vascular tracheal tug or tracheal tug with pulsation or true tracheal tug :<br>• Descent of cricoid cartilage with ventricular contraction in cases of aortic aneurysm as aortic arch overrides the left main bronchus<br>• Patient head is extended, the tip of index is placed below cricoid cartilage with slight pressure upwards → sudden jerky downwards movement of trachea (tugged) sufficiently to squeeze the finger can be felt with each heartbeat (with systole). | ❖ Palpable Sound : diastolic shock = palpable A2 :<br>• Aortic aneurysm e.g. in syphilitic AR<br>• Systemic hypertension<br>• Coarctation of aorta | ❖ Palpable Sound : diastolic shock = palpable 2nd (P2) heart sound (↑S2):<br>• In pulmonary dilatation due to pulmonary hypertension = grade 3 MS<br>♥ ممكن تحس في المنطقة ديه Palpable sound وده معناها ان ال S2↑ ويطلق عليه diastolic shock لان مع ال diast. → diast. Shock → خبطة قوية | | |

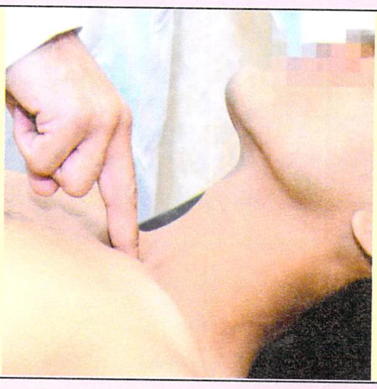
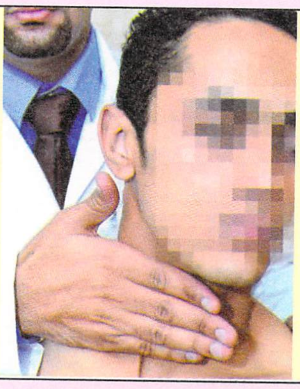
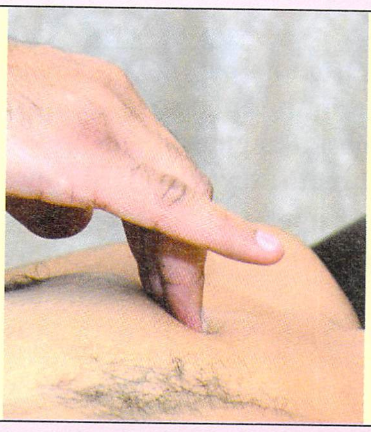
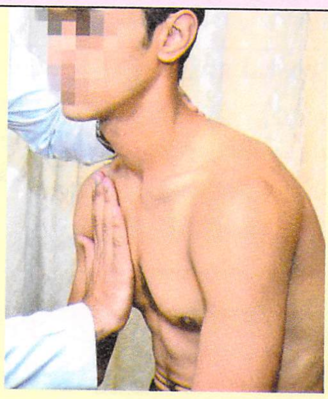
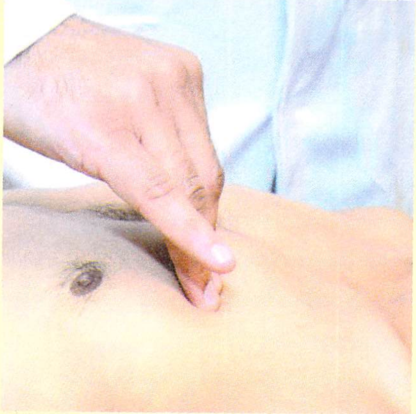
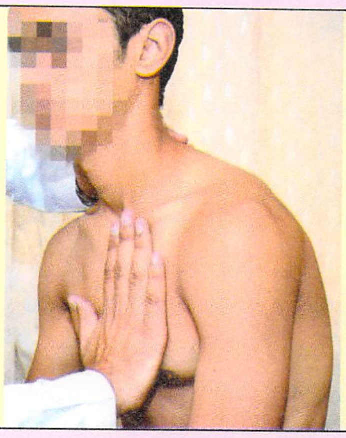
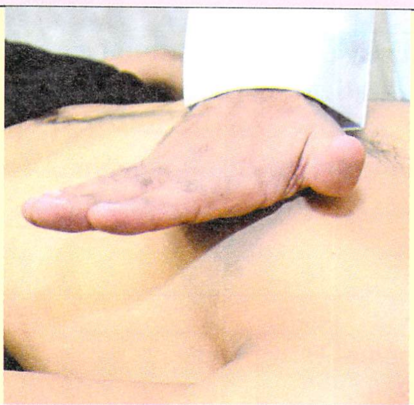
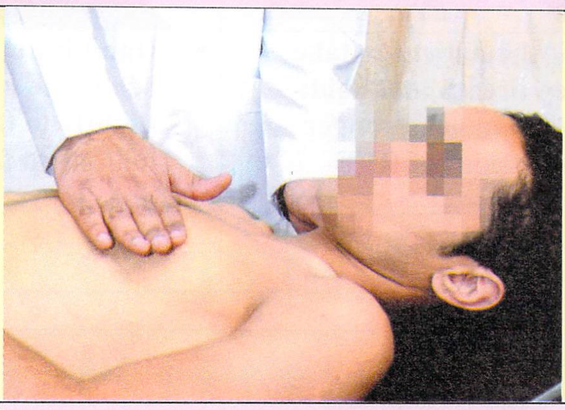
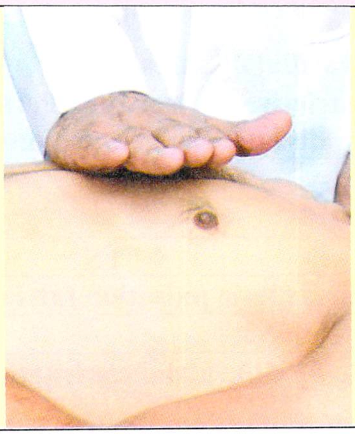
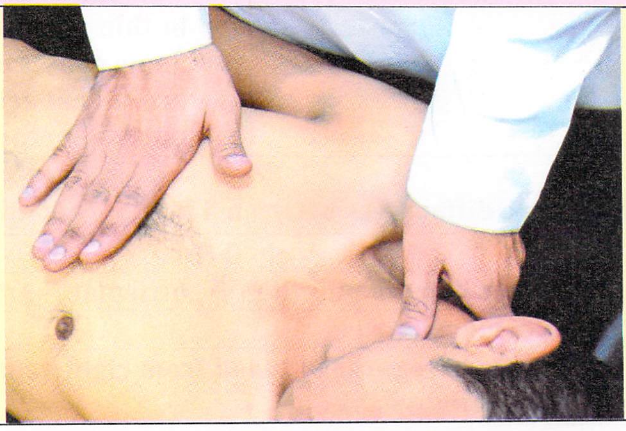
❖ Examination of areas :

➯ Inspection of pulsations :

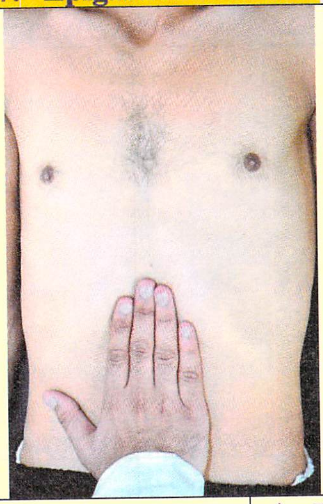
❖ لأن كل ال .Puls ترى tangentially لذلك انزل مرة واحدة وبص عليها بهذا الترتيب والعيان موقف نفسه :

♥ Epigastric → Apical → left parasternal → right parasternal → aortic → pulmonary → suprasternal pulsation

❖ زي حرف S على العيان

| ❖ Pulsation | ❖ Thrill & timing |
|---|---|
| **1. Suprasternal :** | |
|  |  In neck "carotids" |
| **2. 1st aortic area** | |
|  |  |
| **3. Pulmonary area** | |
|  |  |
| **4. Left parasternal area:** | |
|  |  |
| **5. Right parasternal area:** | |
|  |  |

## 7. Epigastric Pulsation

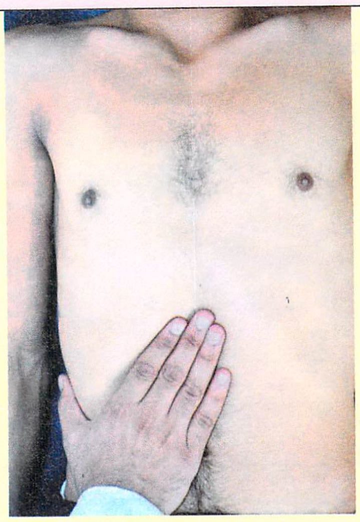
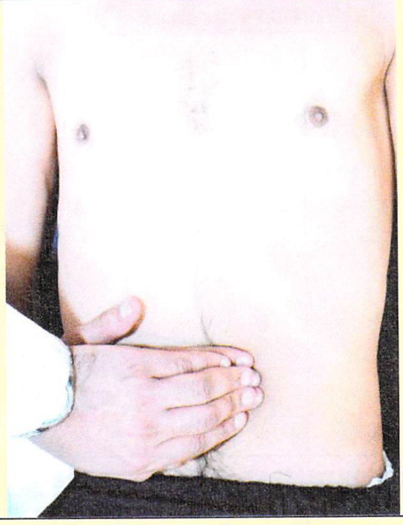
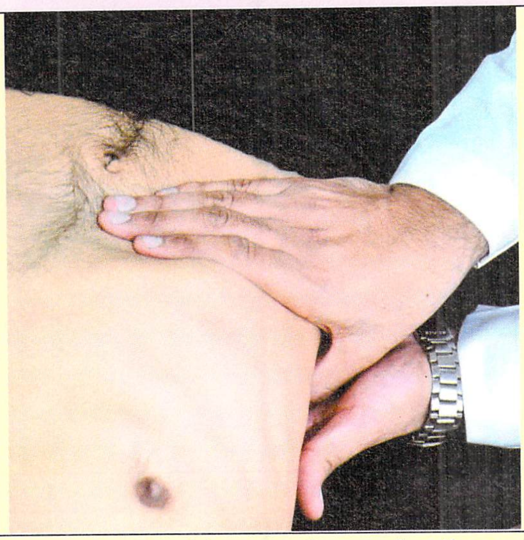


| | | |
|---|---|---|
| ❖ **Site :** below costal angle | ❖ **Inspected :** look tangentially while asking the patient to hold breath المريض يوقف نفسه | ❖ **Pulsation palpated by** placing the extended hand in the epigastric area with fingers in the subcostal angle while the patient is holding his breath; try to feel the pulsation with the finger pads<br>♥ ريح ايدك على البطن وزق صوابعك في ال epigastrium |

❖ Source of pulsation:

| | | |
|---|---|---|
| ○ **From above:** RV enlargement | ○ **From below :** Aortic pulsation | ○ **From right side :** Hepatic pulsation |

❖ Confirmed by:

| | | |
|---|---|---|
|  |  |  |
| ▪ Ask the patient to take **deep breath** and hold; pulsation get stronger<br>▪ Other signs of RVE<br>♥ اجعل صوابعك في مواجهة كتف العيان الشمال وقوله خد نفس جامد واكتمه , هتلاقيها بتزيد تحت ايديك | ▪ Hand is put just above or below the **umbilicus** slightly to the left of the midline to feel the aortic pulsation | ▪ Increased with **bimanual examination** while the patient holding his breathing :<br>♥ ايدك الشمال خلف العيان خلف آخر ribs<br>♥ ايديك اليمين تحت ال right costal margin واضغط |

❖ Causes of pulsation; source:

| | | |
|---|---|---|
| ▪ Causes of RVE:<br>1. **Pulmonary** hypertension<br>2. **Pulmonary** stenosis | 1. The normal aortic pulsation is frequently visible in the epigastrium in **thin people.**<br>2. Same causes of **prominent arterial pulsation** especially AR | 1. Normal thin people<br>2. TR:<br>○ *The Most important cause of hepatic pulsation*<br>3. TS<br>4. Pericardial diseases :<br>• Constrictive Pericarditis, Pericardial effusion<br>5. Liver disease e.g. hemangioma |

❖ What are differences between TR & TS hepatic pulsations ?

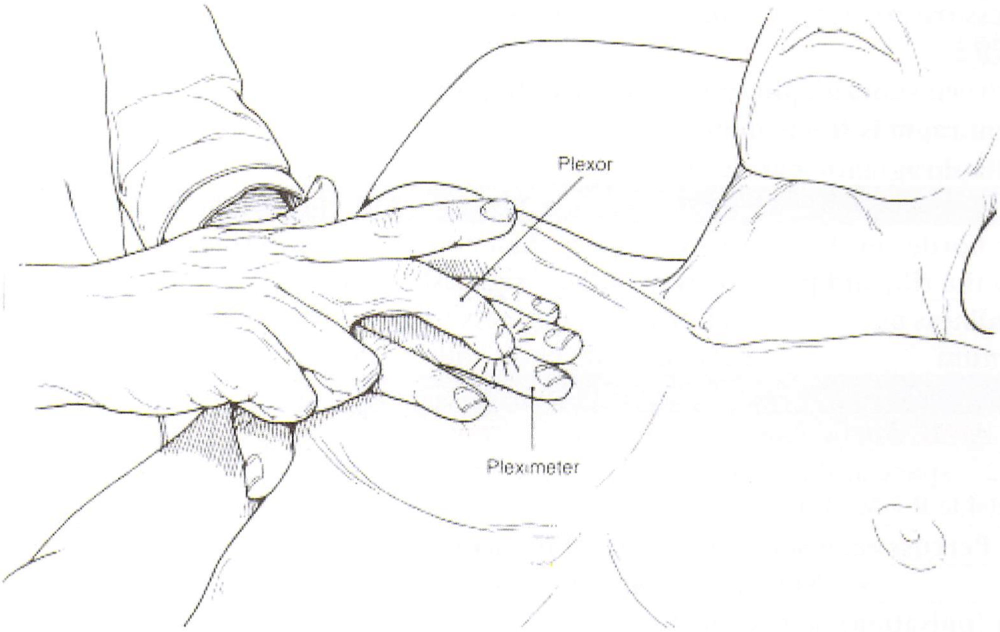
| ❖ TR | ❖ TS |
|---|---|
| ○ Systolic hepatic pulsation (ventricular = arterial) | ○ Presystolic hepatic pulsation (atrial = venous) |
| ○ Coincide with S1 | ○ Coincide with S2 |
| ○ It's due to regurge of blood from right ventricle to IVC during systole | ○ It's due to forcible atrial contraction just before systole |

## II. Percussion

### ❖ Types of percussion:

1. **Heart : Heavy percussion (4-5 cm depth), except bare area by light percussion**
2. **Lung : Light percussion, except back by heavy percussion**
3. **Abdomen : Light percussion, except upper border of liver by heavy percussion**

### ❖ Rules of percussion:



A. **The hand is firmly coapted to the surface**

B. **Percussion is done on the middle phalanx or in interphalangeal joints (pleximeter) by the tip of the middle phalanx of the other percussing hand (plexor)**

C. **Percussion is done from wrist, not from elbow**

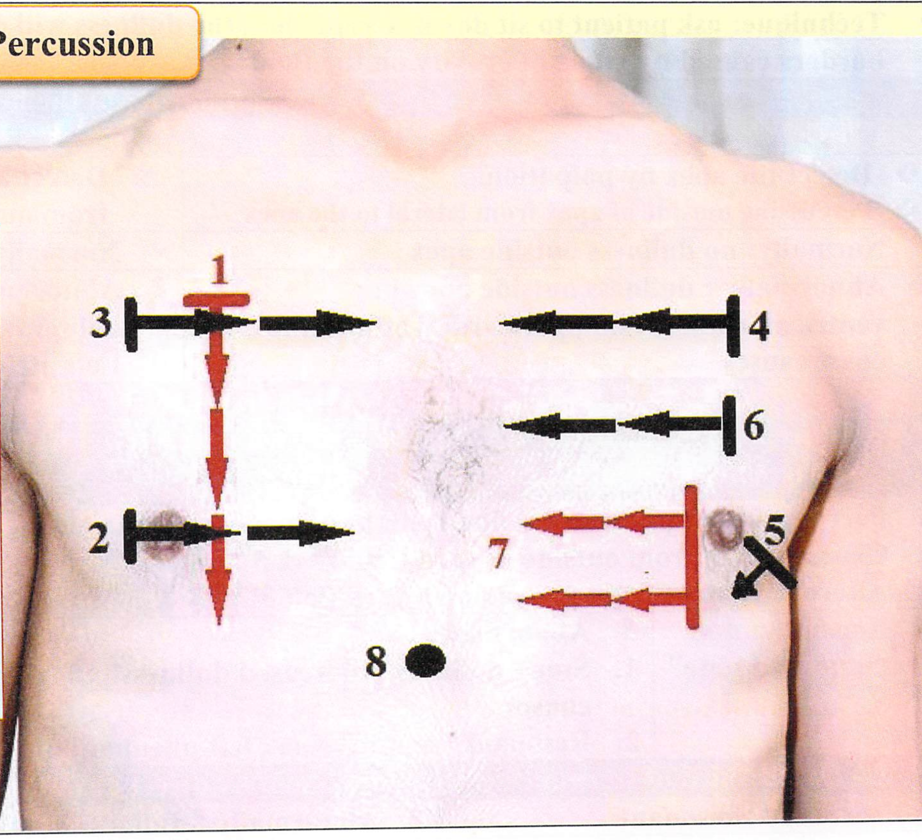
D. **Percussion is done form resonance to dullness, except Kronig's isthmus**

E. **Percussion is done parallel to the border of dullness**

F. **Don't damp the note**

### ❖ Cardiac Percussion: Areas of Percussion

1. Upper border of the liver & Tidal Percussion
2. Right border of the heart
3. Aortic area (right 2nd space)
4. Pulmonary area (left 2nd space)
5. Outside the Apex
6. Waist of the heart (3rd left space)
7. Bare area (left 4th & 5th spaces, light percussion)
8. Lower end of sternum (light percussion)



## I. BY HEAVY PERCUSSION:

### 1. Hepatic dullness (upper border of the liver); Tidal Percussion (TP)

❖ **Definition of TP:** heavy percussion from the front in the RT MCL from above downward or back (Scapular line), after getting the 1st dull space, ask patient to take deep inspiration & repercuss again :

1. **If dullness changes to resonance : infradiaphragmatic** = + ve TP e.g. liver

| | |
|---|---|
| ✓ Normally upper border of the liver in right 5th space MCL | ☠ Abnormally :<br>▪ Lower level of dullness (below right 5th space MCL) : emphysema<br>▪ Higher level of dullness: causes of right lung base dullness (see discussion) |

2. **If dullness persists : supradiaphragmatic or diaphragmatic paralysis** to differentiate percuss again in one space above , while the patient is holding his breath in deep inspiration:

A. **If dullness changes to resonance : supradiaphragmatic dullness** e.g. chest causes (pleural effusion, consolidation, collapse , fibrosis) (-ve TP)

B. **If dullness persists: diaphragmatic paralysis** due to upward movement of paralyzed diaphragm by negative intrathoracic pressure created by inspiration (reversed TP)

❖ **So the value of TP :**

- Differentiate between supradiaphragmatic & infradiaphragmatic dullness
- Indicate that diaphragm is freely mobile
- Reversed TP = diaphragmatic paralysis

### 2. Right border of the heart:

❖ Above the upper border of the liver by one space then move parallel to right border of the sternum, perpendicular to the rib, and percuss from outside right MCL medially.

| | |
|---|---|
| ✓ Normally : no dullness on right side of sternum | ☠ Abnormally: dullness : right atrial enlargement, pericardial effusion, dextrocardia, chest causes, elevated diaphragm (subphrenic abscess). |

### 3. Upper border of the heart; Base of the heart;

| A. 1st Aortic Area | B. Pulmonary Area |
|---|---|
| ❖ Detect the right 2nd space and then Percuss vertically from outside RT MCL towards the aortic area | ❖ Detect the left 2nd space and then Percuss vertically from outside LT MCL towards the pulmonary area |

❖ Percuss each space from lateral to medial from outside MCL to the sternum,

✓ Normally resonant , abnormally dullness occurs in :

| | |
|---|---|
| 1. Aortic dilatation (pulsation), aortic aneurysm<br>2. Post-stenotic dilatation (AS) : no pulsation | 1. Pulmonary artery dilatation (pulsation)<br>2. Post-stenotic dilatation (PS) : no pulsation |

3. Pleural effusion, chest causes, elevated diaphragm (subphrenic abscess)
4. Pericardial effusion : has a shifting dullness

❖ **Shifting dullness :**

- **Definition :** dullness on pulmonary area while patient is lying flat which disappears on sitting
- **Cause :** pericardial effusion
- **Significance :** differentiate between pericardial effusion & pulmonary dilatation as a cause of dullness in pulmonary area
- **Technique:** ask patient to sit down & repercuss the dullness will change to resonant due reshaping of cardiac borders caused by effect of gravity on the fluid

### 4. Left border of the heart:

| A. Apex : | B. Waist of heart :3rd left space : |
|---|---|
| ❖ Detect the apex by palpation.<br>❖ Percussing outside of apex from lateral to the apex | ❖ Detect the left 3rd space and then Percuss vertically from outside LT MCL towards the sternum |
| ✓ Normally: no dullness outside apex | ✓ Normally: 1- 2 finger dullness |
| ☠ Abnormally : dullness outside apex in : ventricular aneurysm , pericardial effusion & chest causes | ☠ Abnormally : dullness more than 2 finger = obliteration of the waist<br>○ Left atrium ++, chest causes. |

## II. BY LIGHT PERCUSSION:

### 1. Bare area of the heart; area of the heart not covered by the lung tissue (cardiac notch) in the left 4th & 5th spaces between midline & parasternal line

❖ Percuss the left parasternal line by light percussion from:

A. Classic way : From outside inward (left 4th & 5th spaces)

B. Alternative way: from above downward (left 3rd, 4th & 5th spaces)

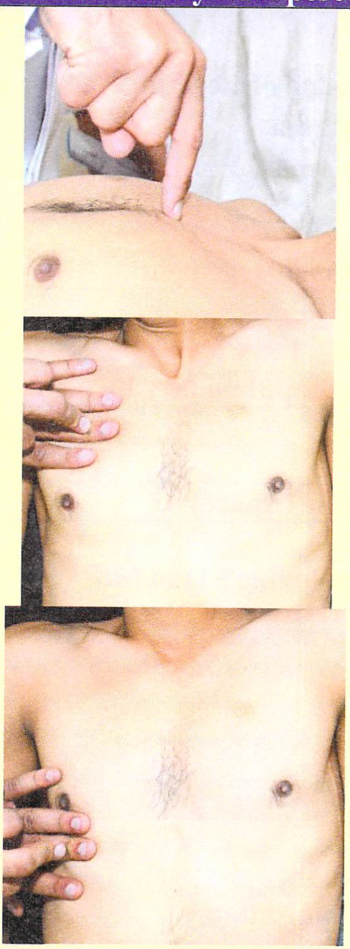
| | |
|---|---|
| ✓ Normally: dull "impaired note" | ☠ Abnormally :<br>1. Stony dullness "Increased dullness" : RV enlargement, pericardial effusion & chest causes<br>2. Resonant : emphysema , left pneumothorax, dextrocardia |

### 2. Lower third of sternum by light percussion by direct or indirect percussion :

| | |
|---|---|
| ✓ Normally : resonant | ☠ Abnormally : dullness occur in RV enlargement. |

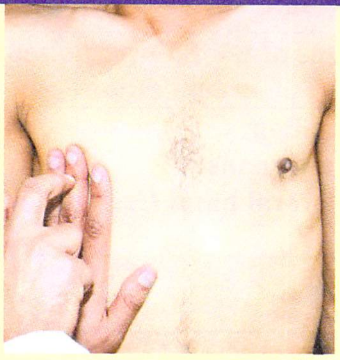
## A. By heavy percussion

### 1. Hepatic dullness by tidal percussion



- ♥ ايدك على ال MCL
- ♥ انزل من ال 2nd space لحد ما تلاقي ال dullness
- ♥ قول للعيان ياخد نفس واكتمه واخبط تاني هتلاقي انها اصبحت resonance لو كانت فعلا liver
- ♥ حدد مكان ال dullness وعد بايدك التانية

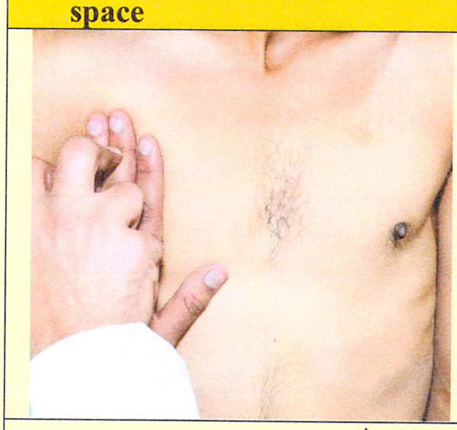
### 2. Right border of the heart



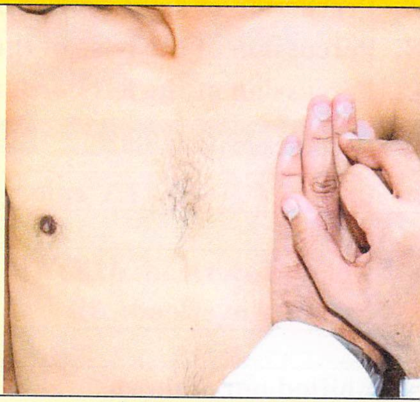
- ♥ نفس اللي فوق كاملا +
- ♥ اطلع one space فوق ال upper border of the liver ثم لف صباعك 90 درجة علشان يكون موازي لل right border

### 3. Upper border of the heart:

- **1st aortic area: right 2nd space**



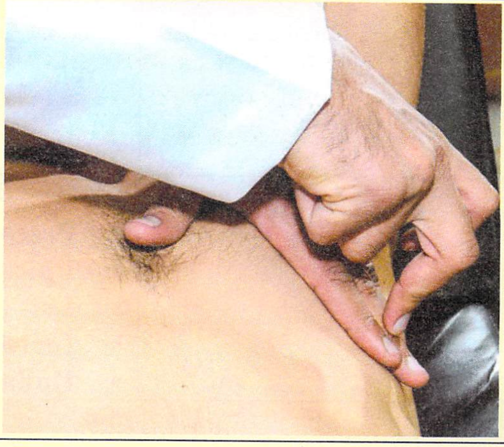
- **Pulmonary area: left 2nd space**



- حدد مكان ال space الاول وبعدين percuss من بره لجوه

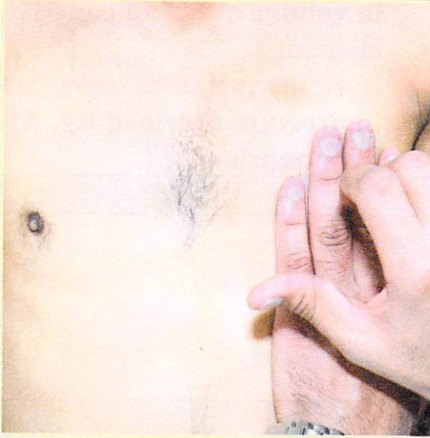
### 4. Left border of the heart:

- **Apex**



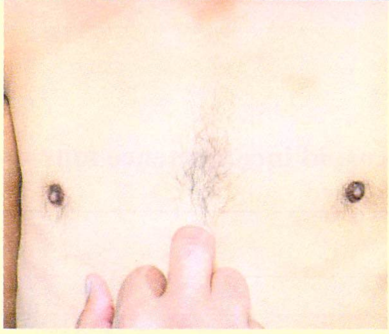
- ♥ خلي العيان يرفع ايده الشمال علشان يوسع
- ♥ تحدد ال apex بعينك ثم تبدأ من براها من عند ال AAL)anterior axillary line ( وتدخل عليها في ال 5th space

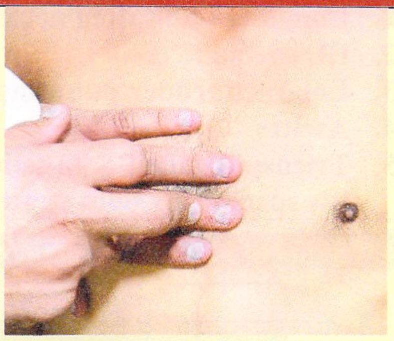
- **Waist of the heart**



- ♥ حدد مكان ال 3rd left space الاول وبعدين percuss من بره لجوه

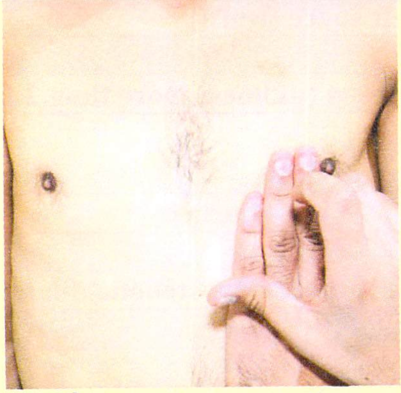
## By light percussion : lower third of sternum



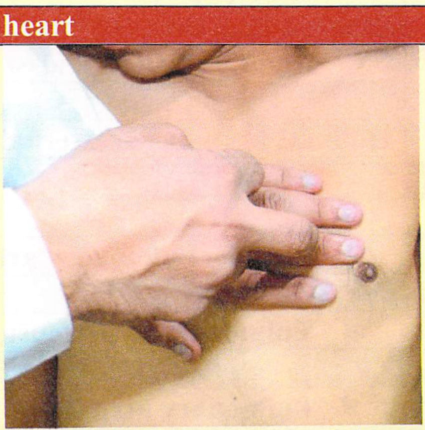


- ♥ خبط على نهاية ال sternum خفيف direct or indirect

## B. By light percussion: Bare are of the heart



- الطريقة ال classic من بره لجوه : حدد ال 5th & 4th space بعلامة ثم ضع يدك vertical وخبط من الشمال (AAL ) لليمين



- الطريقة ال alternative من فوق لتحت : حدد ال 5th & 4th & 3rd space واخبط من فوق لتحت

## Remember

### 1. About percussion:

A. Percussion of right border of the heart = tidal percussion + outside the right edge of sternum + aortic area

B. Percussion of the base of the heart = upper border = aortic area + pulmonary area

C. Percussion of the left border of the heart = outside apex + waist + pulmonary area

### 2. Signs of ventricular enlargement:

| LV enlargement | RV enlargement |
|---|---|
| ☞ Causes | |
| • Volume overload: MR, AR<br>• Pressure overload: AS | • Volume overload : TR, PR<br>• Pressure overload : pulmonary hypertension |
| ☞ Apex | |
| ▪ Shifted out & down | ▪ Shifted out |
| ▪ Localized ( in 1 space) | ▪ Diffuse (more than 1 space) |
| ▪ Hyperdynamic: (forcible non sustained قوية وبتجري) in volume overload e.g. MR, AR.<br>▪ Heaving: (forcible sustained قوية وبتطول ) in pressure overload e.g. AS, VSD, Systemic hypertension | ▪ Tapping (weak)<br>▪ Slapping apex (palpable S1) in MS |
| ☞ Others (bulge, 2 pulsation, 2 dullness) | |
| | ▪ Precordial bulge<br>▪ Epigastric pulsation<br>▪ Left parasternal pulsation<br>▪ Increase dullness “stony dullness” over bare area<br>▪ Dullness over lower 1/3 of sternum |
| ☞ Rocking | |
| ▪ Left or internal rocking:<br>○ Systolic bulge with left parasternal retraction; anti-clock wise rotation | ▪ Right or external rocking:<br>○ Systolic retraction with left parasternal bulge; clock wise rotation |

### 3. Signs of ventricular failure:

| ❖ Signs of RV failure; systemic congestion | ❖ Signs of LV failure; pulmonary congestion |
|---|---|
| 1. Congested pulsating neck veins<br>2. LL edema<br>3. Enlarged tender pulsating liver<br>4. Ascites<br>5. Tricuspid gallop & functional tricuspid incompetence murmur: it’s specific for fight ventricular failure | 1. Apical gallop<br>2. Pulsus alternans<br>3. Fine bilateral basal Crepitations |

### 4. Signs of atrial enlargement:

| ❖ Right atrium | ❖ Left atrium |
|---|---|
| ☞ Causes | |
| TVD (TR غالبا + MVD) | MVD (stenosis or regurge) |
| ☞ Site | |
| Right parasternal area | 3rd left space (waist) |
| ☞ Signs | |
| Dullness in right parasternal area | Obliterated waist of the heart (dullness more than 2 finger) |

### 5. Signs of arterial dilatation:

| ❖ Pulmonary artery | ❖ Aorta |
|---|---|
| ☞ Causes | |
| ▪ Pulmonary hypertension (MS) | ▪ Aortic aneurysm & post-stenotic dilatation |
| ☞ Site | |
| ☞ Pulmonary area | ☞ 1st aortic area |
| ☞ Signs | |
| ▪ Pulsations, Diastolic shock & Dullness | ▪ Pulsations, Palpable S2, thrill & Dullness |

# III. Auscultation

## 1. Auscultation for :

I. **Heart sounds (S1 : over the Apex , S2 : over the Pulmonary area)**

II. **Additional heart sounds (Systolic clicks; ejection click & opening snap)**

♥ تعرفهم بعد تشخيص الحالة وتقول للدكتور (المفروض) اني اسمع كذا ... بس مش قادر أميزه { لأنهم مش هايتسمعوا لانهم محتاجين خبرة كبيرة اوي ! }

III. **Murmurs; Comment on the following: SACT.R**

| | | |
|---|---|---|
| • **Site of maximum intensity** | • **Area of propagation** | • **Character** |
| • **Timing** | • **Thrill & Grade** | • **Type (organic or functional)** |
| • **Relation to position , respiration & exercise** | | |

IV. **Others heart sounds (metallic click)**

## 2. Parts of stethoscope used for the sounds :

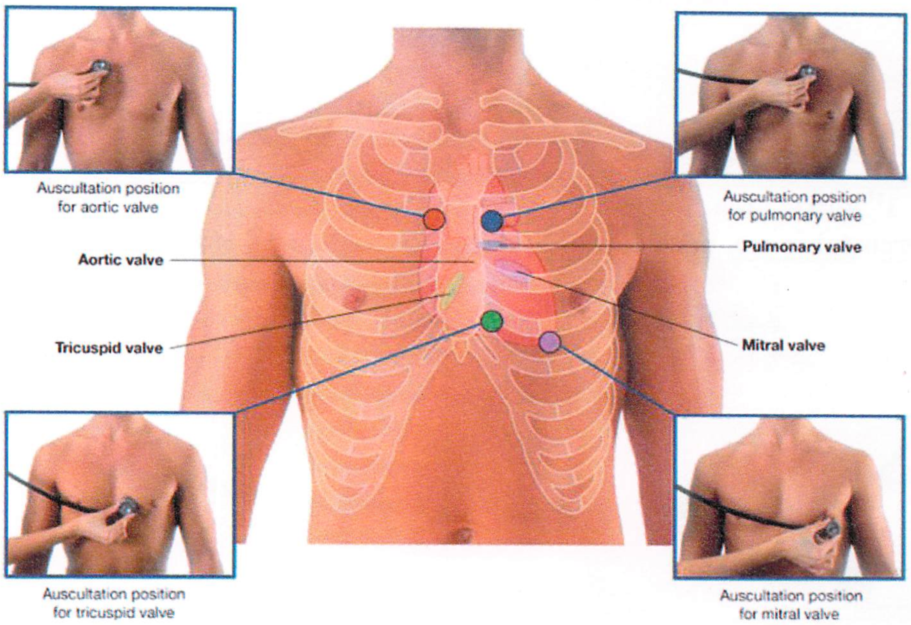
- ○ **Cone = bell (lightly applied): for low pitched sounds (murmur of MS, S3, S4).**
- ○ **Diaphragm (firmly applied): for high pitched sounds : the rest of sounds.**

## 3. The maneuver of auscultation: Z-Shaped auscultation: (M→T→P→A1)

❖ **Technique : use the cone and auscultate the mitral area & tricuspid area then use the diaphragm and auscultate M→T→P→A1→A2→left parasternal→ axilla → root of the neck & over carotid arteries**

❖ **Site of auscultation:**

- ○ **Pulmonary & tricuspid valve are anterior so, heard at their anatomical sites**
- ○ **But aortic & mitral valve are posterior so, hear at the direction of blood flow**


Auscultation position for aortic valve
Aortic valve
Tricuspid valve
Auscultation position for tricuspid valve
Auscultation position for pulmonary valve
Pulmonary valve
Mitral valve
Auscultation position for mitral valve

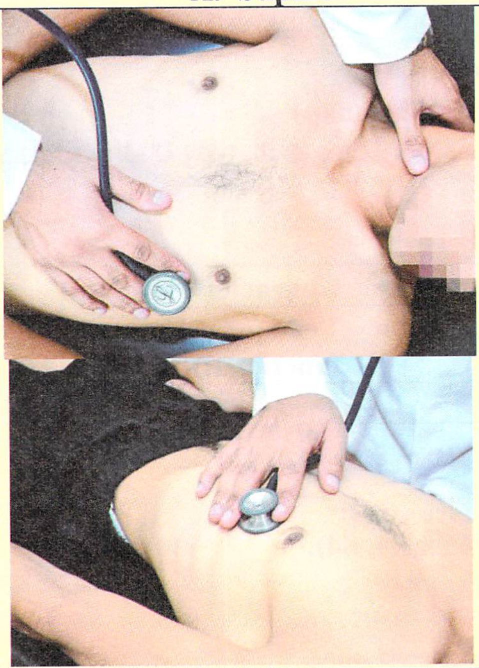
❖ **قوانين ال Auscultation :**

1. **Time ← طول ما السماعة على العيان , ايدك على ال Carotid**
   - **Systole: مع ضربة (طلعة) ال Carotid**
   - **Diastole: مع نزلة (سحبة) ال Carotid**
2. **Site ← تحرك السماعة لحد لما توصل Site of maximum intensity**
3. **Character ← (cone → low pitch) (diagram → high pitch)**
4. **لو في Position معين بيزود ال murmur اعمله**
5. **اوعى تقول تشخيص لو سألك الدكتور سامع ايه**
6. **اوعى تعلق على ال murmur تسميعاً من الكتاب**

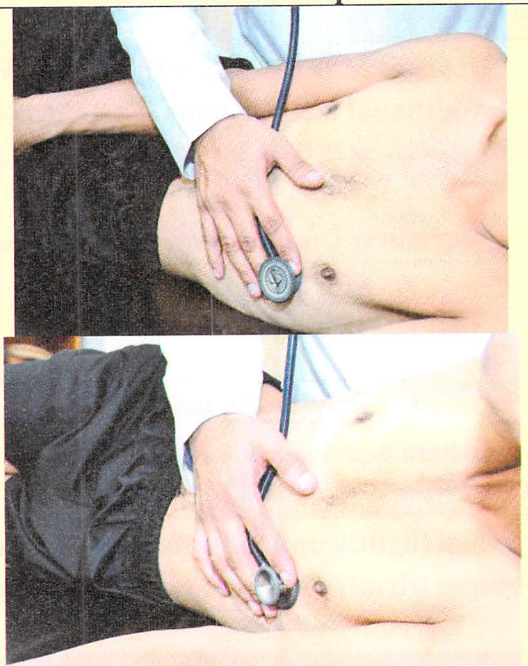
## ❖ Auscultation of:

**1. Mitral area: (cone & diaphragm) = Apex : 5th left space just inside MCL**

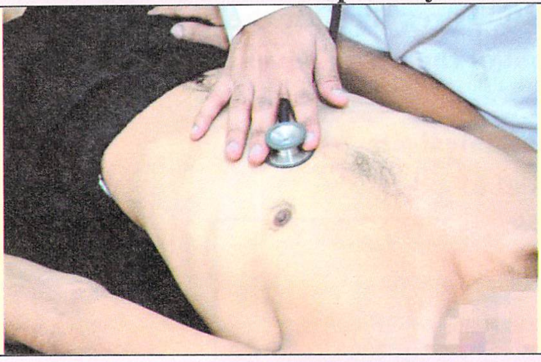
**A. Supine**



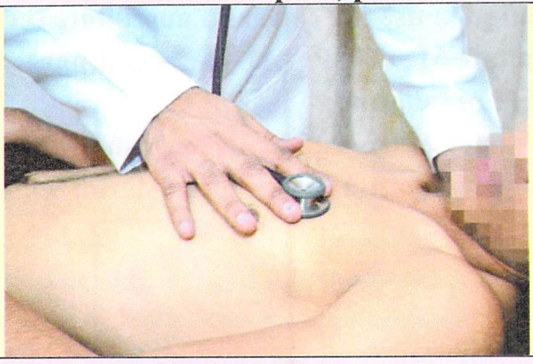
**B. Left lateral position**



**2. Tricuspid area:**
**Lower end of sternum especially to the left.**

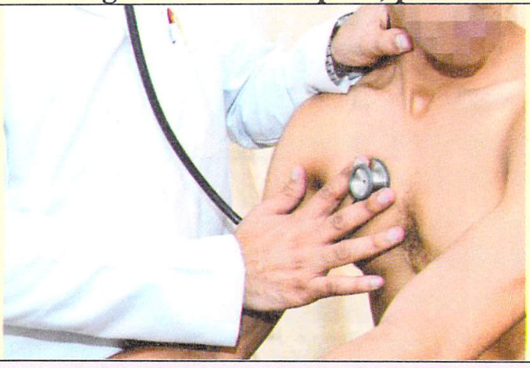


**3. Pulmonary area:**
**2nd left intercostal space, parasternal line**

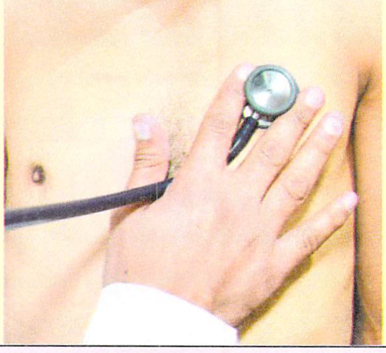


**4. Aortic area**

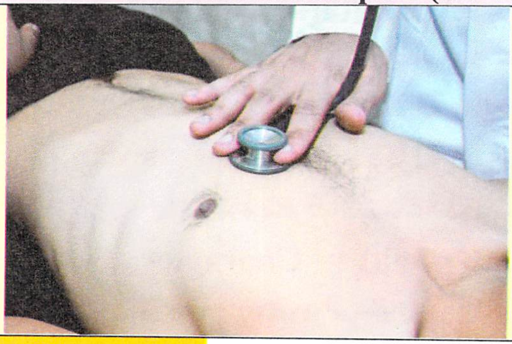
**A. 1st aortic area:**
**A1 : 2nd right intercostal space, parasternal line**



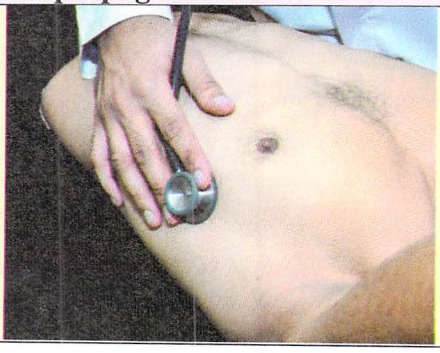
**B. 2nd aortic area:**
**A2 : 3rd left intercostal space, parasternal line**



**5. Left parasternal area;**
**over 3rd & 4th intercostal space (for VSD)**



**6. Axillary area :**
**propagation of MR murmur**



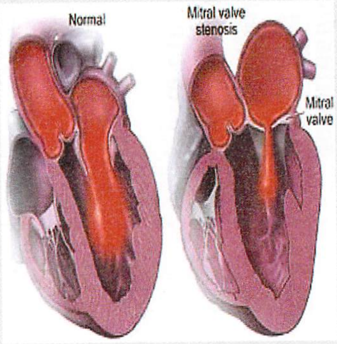
## ❖ Cardiac cases :

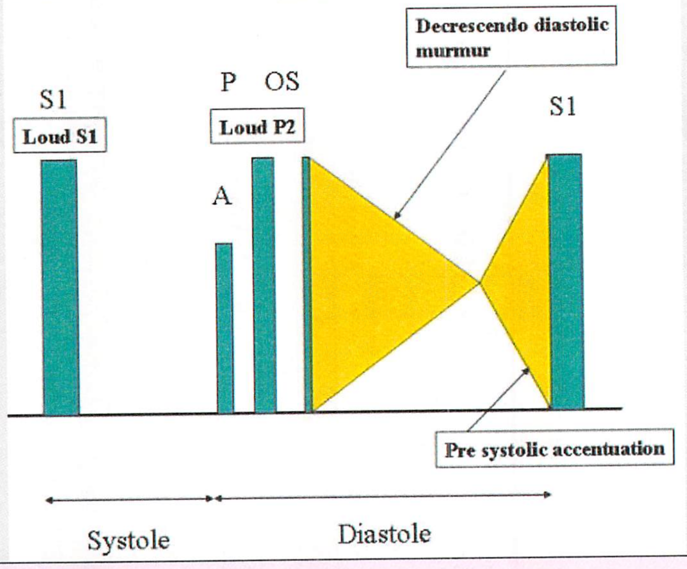
- **Uni-valvular lesion: PS, AS, VSD, MT, TR, AR , MS**
- **Multi-valuvular lesion : see later**
- **As a part of cardiac case: valve replacement case, Marfan syndrome & Noonan syndrome**

| PS | AS | VSD | MR | TR | AR | MS |
|---|---|---|---|---|---|---|
| ☞ **Apex Examination** | | | | | | |
| ▪ Signs of RVE with heaving apex | ▪ Signs of LVE with heaving apex | ▪ Biventricular enlargement with hyperdynamic apex (HDA) | ▪ Signs of LVE with HDA | ▪ Signs of RVE with HAD<br>▪ General signs | ▪ Signs of LVE with HAD<br>▪ General "Peripheral" signs | ▪ Signs of RVE with slapping apex (brief, palpable S1)<br>▪ Diastolic shock (palpable S2 over pulmonary area); pulmonary hypertension |
| ☞ **Thrill; Site & Time :** | | | | | | |
| ▪ Over Pulmonary area | ▪ Over A1 propagated to apex & neck (carotids) & ↑ on leaning forward | ▪ Over 3rd & 4th left intercostal space | ▪ Over apex<br>▪ ↑ in left lateral position | ▪ Over tricuspid area | ▪ No thrill over A1<br>▪ Only in neck: AR | ▪ Over apex<br>▪ ↑ in left lateral position |
| ▪ Systolic | ▪ Systolic | ▪ Systolic | ▪ Systolic | ▪ Systolic | ▪ Systolic | ▪ Diastolic |
| ☞ **Auscultation: Heart sounds,** | | | | | | |
| 1. S1 over Mitral area | | | | | | |
| | ▪ Normal | | ▪ ↓ Muffled | ▪ ↓ Muffled | | ▪ ↑ Accentuated |
| 2. S2 over Pulmonary area | | | | | | |
| ▪ ↓ Muffled | ▪ ↓ Muffled | ▪ ↑ Accentuated (P.HTN) | | | ▪ Normal or ↓ or ↑ | ▪ ↑ Accentuated, (P.HTN) |
| ☞ **Auscultation: Murmur, Site of maximum intensity, Area of propagation, Character, Timing, Relation to position, respiration & exercise, Additional sounds** | | | | | | |
| ▪ Pulmonary area | ▪ 1st aortic area | ▪ Left parasternal | ▪ Apex | ▪ Tricuspid | ▪ 2nd aortic area | ▪ Apex |
| ▪ Tricuspid area (down)<br>▪ May be under left clavicle (up) | ▪ Carotid (up)<br>▪ Apex (down) | ▪ Whole precordium | ▪ If anterior leaflet regurge to axilla<br>▪ If posterior leaflet : regurge to base & sternum | ▪ Apex | ▪ Apex | ▪ Localized, not propagated |
| ▪ Harsh | ▪ Harsh | ▪ Harsh | ▪ Soft | ▪ Soft | ▪ Soft blowing | ▪ Rumbling (cone) |
| ▪ Ejection systolic | ▪ Ejection systolic | ▪ Pansystolic | ▪ Pansystolic | ▪ Pansystolic | ▪ Early diastolic | ▪ Mid diastolic presystolic with presystolic accentuation |
| ▪ ↑ with inspiration | ▪ Best heard with diaphragm, patient is:<br>○ Sitting<br>○ Leaning forward<br>○ Holding his breath in forced expiration (↑ with expiration)<br>▪ ↓ with exercise | | ▪ Patient :<br>○ On left lateral position<br>▪ ↑ with exercise | ▪ ↑ with inspiration (Carvollo's sign) | ▪ Best heard with diaphragm, patient position as AS<br>▪ ↑ with exercise | ▪ Best heard with cone, patient position is:<br>○ On left lateral position<br>○ ↑ with exercise |
| • E.C. & S4 | • E.C. & S4 | • S3 | • S3 | • S3 | • S3 | • Opening snap |

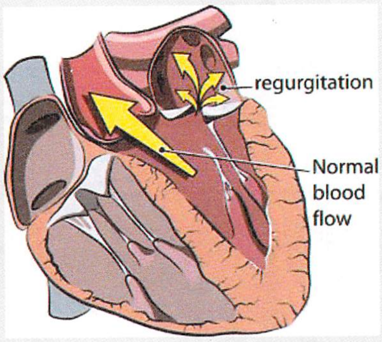
## ❖ أهم أربعة Valve lesions ممكن يطلب منك الدكتور إنك ترسمهم :

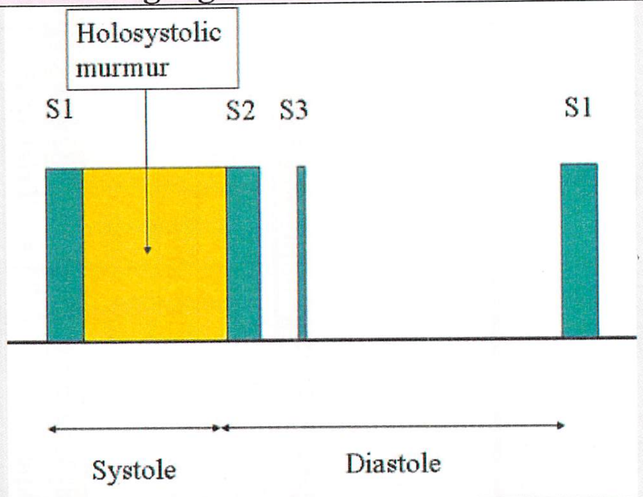
### ❖ Mitral stenosis


Normal
Mitral valve stenosis
Mitral valve

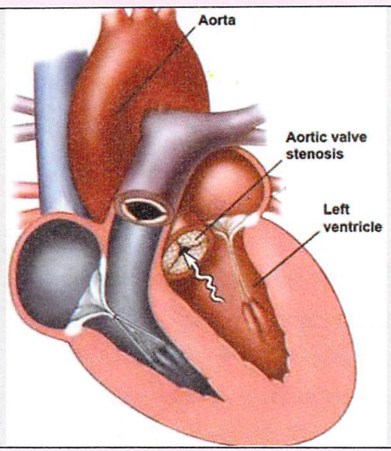

Decrescendo diastolic murmur
S1
Loud S1
P
OS
Loud P2
A
S1
Pre systolic accentuation
Systole
Diastole

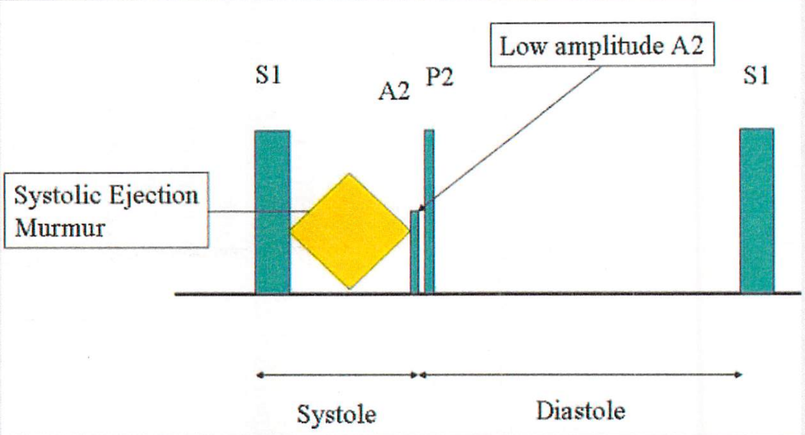
### ❖ Mitral regurge


regurgitation
Normal blood flow

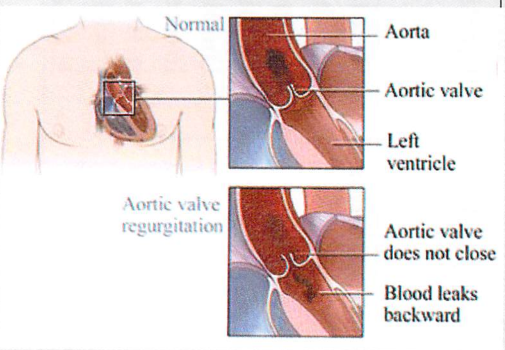

Holosystolic murmur
S1
S2
S3
S1
Systole
Diastole

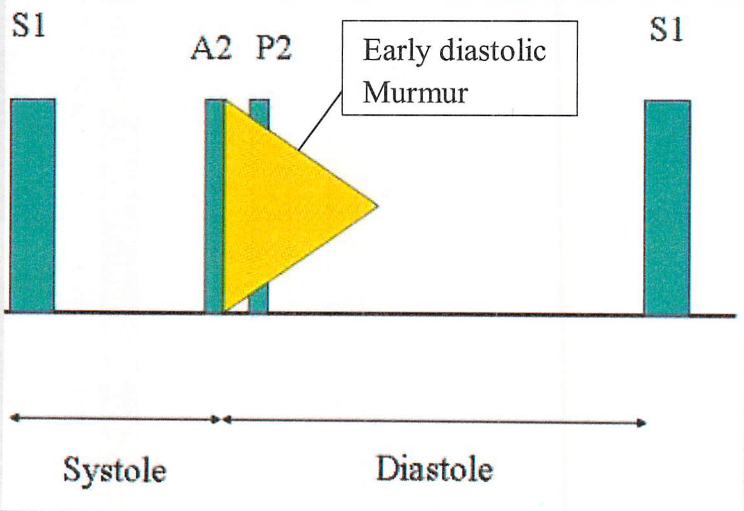
### ❖ Aortic stenosis


Aorta
Aortic valve stenosis
Left ventricle


Low amplitude A2
S1
A2
P2
S1
Systolic Ejection Murmur
Systole
Diastole

### ❖ Aortic regugre


Normal
Aorta
Aortic valve
Left ventricle
Aortic valve regurgitation
Aortic valve does not close
Blood leaks backward


S1
A2
P2
Early diastolic Murmur
S1
Systole
Diastole

## Special notes

1) **LVE with MR, AS, AR**

2) **RVE with MS, PS, TR**

3) **BVE : VSD**

4) **All valvular lesion with systolic thrill in the specific area of valve except :**
   - MS : Diastolic thrill
   - AR no thrill in A1, only in neck

5) **All murmurs are systolic in time except AR (& PR), MS (&TS), are diastolic.**

6) **Any valvular regurge is soft in character & with hyperdynamic apex (volume overload)**

7) **Any valvular stenosis is harsh in character & with heaving apex (pressure overload) expect MS is rumbling in character & with slapping apex**

   ❖ **N.B.: VSD : is harsh in character with hyperdynamic apex.**

8) **To detect S2 is accentuated (P.HTN) or not :**

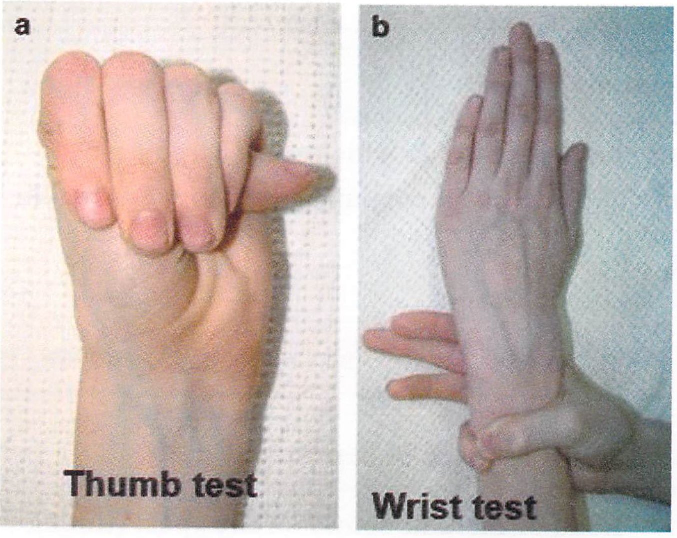
- **Auscultate Over pulmonary area & compare between S2 over pulmonary area & S2 in aortic area:**

→ **S2 accentuated: when S2 gets higher in pulmonary area more than in aortic area**

## Marfan syndrome

❖ **Definition : multisystem connective tissue disorder; autosomal dominant trait characterized by systemic affection :**

1. **Positive family history**
2. **Skeletal manifestations:**
   - **Long bone : disproportionate tall stature**
   - **Short bone : arachnodactyly (long slender finger) proved by:**
     a. **Thumb test**
     b. **Wrist test**
   - **High arched palate**
   - **Flat foot; pes planus**
   - **Pectus excavatum or carinatum**
   - **Kyphoscoliosis**
3. **Eye: subluxation of lens , ectopic lentis**
4. **Chest: cystic diseases**
5. **Cardiovascular :**
   - **Aortic aneurysm**
   - **Dilated ascending aorta → AR**
   - **Mitral valve prolapse → MR**



**? How to diagnose Marfan ?**

❖ **Marfan syndrome:**

- **Positive family history**
- **Plus Skeletal manifestation**
- **Plus at least 2 Systems affected**

**? What other conditions may mimic Marfan syndrome = differential diagnosis ?**

1. **Marfanoid feature : skeletal manifestation only**
2. **Homocystinuria :**
   - **Patient have many symptoms and signs as tall stature & ectopic lentis**
   - **Aortic aneurysm is not a feature**
   - **Inheritance is recessive**
3. **Familial thoracic aortic aneurysm syndrome :**
   - **Has many feature of Marfan syndrome + autosomal dominant trait**
4. **MASS phenotype :**
   - **Has many feature of Marfan syndrome**
   - **But.follow a more benign course**

# Valve replacement case

## ❖ Types of surgery:

<table>
<tr><th colspan="2">A. Closed heart surgery</th><th colspan="2">B. Open heart surgery</th></tr>
<tr><td colspan="4">❖ Definition</td></tr>
<tr><td colspan="2">No heart lung machine</td><td colspan="2">Using heart lung machine</td></tr>
<tr><td colspan="4">❖ e.g.</td></tr>
<tr><td colspan="2">• Closed mitral commissurotomy (Valvulotomy)</td><td colspan="2">• For stenosis :<br>○ Open valvulotomy, replacement by prothesis<br>• For regurge :<br>○ Repair, replacement by prothesis</td></tr>
<tr><td colspan="4">❖ Indications</td></tr>
<tr><td colspan="2">• Isolated non calcific MS</td><td colspan="2">• All valvular lesions except Isolated non calcific MS</td></tr>
<tr><td colspan="4">❖ Scar</td></tr>
<tr><td colspan="2">• Lateral thoracotomy (left inframammary)</td><td colspan="2">• Median sternotomy</td></tr>
<tr><td colspan="4">❖ Complications for both:</td></tr>
<tr><td>1. Arrhythmias</td><td>2. Embolization</td><td>3. Valve regurge & restenosis</td><td>4. Postcardiotomy syndrome</td></tr>
<tr><td colspan="4">5. Complications of artificial valves :<br>• Infective endocarditis, Thromboembolism, Mechanical dysfunction & Hemolytic anemia</td></tr>
</table>

## ❖ Types of prosthesis:

| A. Tissue | B. Mechanical |
|---|---|
| ○ Less durable : short life | ○ More durable: long life |
| ❖ Others: | |
| ○ Less need for anticoagulant | ○ Thrombosis : anticoagulant for life |
| ○ Prosthetic valve endocarditis | ○ Prosthetic valve endocarditis |
| | ○ Hemolytic anemia |

## ❖ How to know?

- **History :** of operation & which valve is replaced
- **Examination :** Scar of median sternotomy & Metallic sound may be heard

## ❖ How to deal?

### → As a cardiac case + answer the following questions:

### 1. Which valve is replaced ?

❖ Loud or metallic sound on the apex: (timing with carotid)
- Metallic S1→ Mitral Valve Replacement
- Metallic S2→ Aortic Valve Replacement

### 2. Complicated or not? لازم تسأل العيان عن المضاعفات ولازم تذكرها بالاثبات او النفي

A. **Hemolytic anemia :** pallor + jaundice +fever

B. **Thrombo-embolism :**
  - ○ Symptoms of embolization e.g. hemiplegia
  - ○ Feel all arterial pulsation

C. **Prosthetic valve endocarditis :**
  - ○ Fever, clubbing, petechial hemorrhage & splenomegaly

### 3. The valve is functioning properly or not?

- **If dysfunction :** you will hear murmur of the lesion of the prosthetic valve “ stenosis or regurge”
- With the criteria of murmur of same rheumatic lesion of same valve

## General “peripheral” signs of TR :

A. Cyano-icteric face (mild jaundice from liver congestion & peripheral cyanosis from LOCP)
B. Congested pulsating neck veins with systolic expansion
C. Enlarged tender pulsating liver with systolic pulsation.
D. Ascites precox; ascites before Lower limb oedema.
E. Percussion: right border dullness

## General “peripheral” signs of AR :

### A. Head & neck

| | | |
|---|---|---|
| 1. **Corrigan’s sign :** visible vigorous pulsation in carotid arteries in neck | 2. **De Musset sign :** head nodding due to severe pulsation<br>❖ **Other causes of head nodding:** cerebellar ataxia, parkinsonism myoclonic epilepsy & tics | 3. **Systolic thrill “carotid shudder” :** over carotids due to rapid blood flow |

### B. Upper Limb :

1. **Wide pulse pressure** : exaggerated difference between systolic & diastolic blood pressure (Normally 30 – 60 mmHg)
2. **Water Hammer pulse “Collapsing pulse”**
3. **Capillary pulsation is demonstrated as follows :**

| | | |
|---|---|---|
| ▪ **Quincke’s sign :**<br>○ **Capillary pulsation in the nail bed :** Pressing by finger on patient’s nail just to cause blanching , the test is positive when the blanched area becomes alternatively red/blanch with each heart beat | ▪ **Transillumination** by shining a pen torch through: **Lobule of ear**<br>▪ **Forehead “Lighthouse sign”** by scratch: blanching & flushing of forehead | ▪ **Fundus** by ophthalmoscope : retinal capillaries are pulsating **“Becker’s sign”**<br>▪ **Lips** by pressure by glass slide to produce blanched area<br>▪ **Uvula “ Muller’s sign”** by tongue depressor |

### C. Lower Limb :

1. **Hill’s sign :** exaggerated difference between SBP in LLs & ULs more than 50 mmHg (normally, SBP in LLs is higher than ULs by about 10 – 20 mmHg)
2. **Pistol shot “Traub’s sign”:** auscultation of a loud booming sound synchronous with each pulse beat over the arteries especially femoral due to sudden distension of collapsed artery
3. **Duroziez’s sign :** systolic & diastolic murmurs over the femoral artery if it is slightly compressed with the stethoscope.

### ❖ Significance of peripheral signs:

- Nonspecific present in hyperdynamic state
- Determine severity

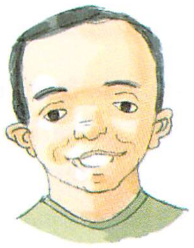
### ❖ Absent peripheral signs in :

- Mild aortic regurge
- Associates stenotic valvular lesion:
  - Double aortic lesion with predominant stenosis
  - MS
- Heart failure
- Systemic hypertension

❖ **N.B.:** differential diagnosis between organic AS & function AS in AR

- **Functional AS** systolic soft murmur localized over the 1st aortic area with normal S2 & no associated thrill
- **Organic AS** (double aortic lesion): in which the murmur is harsh ejection systolic propagated to the neck and the apex, muffled S2 & associated with thrill and the patient complains of low COP symptoms.

## Pulmonary stenosis:



- May be due to malignant carcinoid tumour or due to congenital as Noonan syndrome

**❖ Noonan syndrome:**

- Stunted growth, Subnormal mentality, congenital Skeletal deformity
- Congenital heart disease (e.g. PS) & Special facial feature

## Effect of AF on mitral stenosis lesion:

1. **Neck veins :** absent a wave with systolic expansion
2. **Pulse :** marked irregularity
3. **Pulsus deficit :** more than 10 beats / min
4. **Auscultation:**

| | | |
|---|---|---|
| ○ Loss of presystolic accentuation | ○ Variable S1 | ○ Loss of S4 (no atrial contraction) |

5. **Complications:**

- Thromboembolism (percentage of complication increase from 10% → 40 %)
- Pulmonary oedema

6. **ECG:** absent P wave, marked irregularity

# Multi-Valvular Affection:

## Double mitral lesion = MR + MS:

A. **By history :** palpitation + dyspnea

B. **By general examination :** AF (irregular pulsation + systolic expansion of neck vein) + Orthopnea

C. **By local examination:**

1) **Biventricular enlargement**

| ❖ If regurge predominate | ❖ If stenosis predominate |
|---|---|
| • Displaced apex | • Undisplaced apex |

2) **Signs of Pulmonary hypertension; signs :**

- General examination; neck vein: Giant a wave
- Inspection : pulmonary pulsation, diastolic shock
- Percussion: dullness in pulmonary area
- Auscultation:

| | | |
|---|---|---|
| ○ S2 ↑ | ○ Systolic ejection click | ○ Systolic ejection murmur due to functional pulmonary stenosis (due to dilated pulmonary trunk) |
| ○ Close splitting of S2 | | |
| ○ Soft early diastolic murmur due to functional pulmonary regurge (Graham steel) (due to dilated pulmonary ring) | | |
| ○ S4 over the tricuspid area | | |

3) **Murmur :**

| | |
|---|---|
| • Murmur of MR alone if murmur of MS is silent | • Murmur of both MR & MS |

4) **Sounds:**

| ▪ If regurge predominate | ▪ If stenosis predominate |
|---|---|
| ▪ ↓ S1 | ▪ ↑ S1 |
| ▪ S3 over the apex if regurge predominate | |
| ▪ NO Opening snap | |

## Double aortic lesion = AR + AS

A. **By history :**

| ❖ If regurge predominate | ❖ If stenosis predominate |
|---|---|
| • Palpitation | • LOCP Symptoms |
| • Chest pain | • Chest pain |
| • ± Pulmonary congestion | • ± Pulmonary congestion |

B. **By general examination :**

| ❖ If regurge predominate | ❖ If stenosis predominate |
|---|---|
| ♥ Peripheral signs of AR especially :<br>• Collapsing pulse, Wide pulse pressure , Corrigan's sign, Duroziez's sign | • Regular, slow rising pulse |

C. **By local examination:**

| ❖ If regurge predominate | ❖ If stenosis predominate |
|---|---|
| • LVE with hyperdynamic apex<br>• ± Gallop rhythm (volume overload on LV) | • LVE with heaving apex |
| • S1 : normal<br>• S2 : ↓<br>• Murmur of both:<br>○ AS: harsh ejection systolic murmur maximally over A1, propagating to neck<br>○ AR: soft early diastolic murmur, maximally over A2 | |

## Aortic stenosis with Mitral stenosis

❖ **By history :**

| AS | MS |
|---|---|
| LCOP | Dyspnea |
| | • MS may be complicated by irregular palpitation + systemic congestion |

❖ **By general examination :**

- Regular pulse or irregular ( as MS may be complicated by irregular palpitation; AF)
- Ankle edema (systemic congestion)

❖ **By local examination:**

- AS: harsh ejection systolic murmur maximally over A1, propagating to neck
- MS: rumbling mid diastolic murmur maximally over the apex, palpable S1

## Mitral regurge with Aortic regurge:

❖ **By history :**

| ♥ Mitral regurge | ♥ Aortic regurge |
|---|---|
| ○ Palpitation | ○ Palpitation |
| ○ Dyspnea | ○ Chest pain |

❖ **By general examination :**

- Regular pulse
- Not uncommon to find elevated jugular venous pressure as indication of volume overload
- ± peripheral signs of AR

❖ **By local examination:**

- Signs of LV enlargement (displaced apex) & volume overloading (gallop rhythm)
- MR: soft pansystolic murmur maximally over apex & radiating to axilla
- AR: soft early diastolic murmur, maximally over A2

## Mitral stenosis with Aortic regurge:

- By history → dyspnea, palpitation & chest pain
- MS masks signs of Peripheral signs of AR
- ↑ S1 & ↑ S2
- Murmur of AR
- Murmur of MS + Austin - flint murmur (relative murmur of MS in severe AR)

## Mitral regurge with Aortic stenosis

- Murmur of MR
- Murmur of AS

## Double Mitral with Double Aortic:

1. **By history:**
- Chest pain → AVD غالبا
- Pulmonary congestive symptoms (dyspnea) :
  → MVD غالبا
  → LVF صعب
- Palpitation → volume overload (MR, AR)
- LCOP → stenotic lesion (AS + MS)
2. **Suggested findings:**
- Peripheral signs of AR → AR
- Thrill on the base of the heart propagating to the neck → AS
- Apex hyperdynamic volume overload (MR, AR)
- Right ventricular pulsations → epigastric, left parasternal pulsation (associated MVD احتمال وجود )
- ↑↑ S1 + pansystolic murmur → double mitral lesion (silent MS)

3. **N.B.:**
- Silent MS = MS with no murmur due to:
  A. High LV pressure: LVF.
  B. Low LA pressure:
    - Severe pulmonary hypertension.
    - RVF.
  C. In association with ASD.

❖ N.B.: ASD + Acquired MS = Lutembacher syndrome

# Diagnosis Of Cardiac Case

## I. Etiological diagnosis:

**A. Rheumatic heart disease:**

- Past history of rheumatic fever:
- Recurrent tonsillitis , pharyngitis , fever, arthritis
- Intake of anti-inflammatory (aspirin & steroid)
- IM injection of long acting penicillin

- Organic mitral stenosis, there is a thrill
- Double valve lesion (e.g. double mitral)
- Multivalvular = More than one valve affected (e.g. mitral & tricuspid)

**B. Congenital:**

1. Young age
2. Central cyanosis & clubbing
3. Associated congenital anomaly
4. Organic pulmonary lesion

**C. Others:** ischemic, hypertensive, cardiomyopathy, systemic disease

## II. Anatomical diagnosis:

**I. Endocardial:** valvular lesion e.g. AR, MS

**II. Myocardial (chamber enlarged):**

1) RV enlargement : signs of RVE see before
2) LV enlargement: signs of LVE see before.

3) RA enlargement : dullness to the Rt. side of sternum
4) LA enlargement : obliteration of cardiac waist (better radiological diagnosis)

5) Pulmonary artery dilatation :
   - ○ Pulsation & dullness in Pulmonary area
   - ○ Diastolic shock & Accentuated S2
6) Aortic dilatation:
   - ○ Pulsation and dullness in 1st Aortic area & Accentuated S2

**III. Pericardial :** pericarditis, pericardial effusion

## III. Functional diagnosis:

**❖ Compensation:**

**I. Compensated:** no symptoms or signs of failure

**II. Decompensated; in failure:**

1. Right Side Failure :
   - ○ Symptoms of systemic congestion
   - ○ Congested neck veins
   - ○ Enlarged tender liver
   - ○ LL edema
2. Left Side Failure :
   - ○ Symptoms of pulmonary congestion
   - ○ Apical gallop
   - ○ Pulsus alternans
   - ○ Fine bilateral basal crepitations

**❖ Complications:**

1. Arrhythmia e.g. AF
2. Rheumatic activity & SBE
3. Pulmonary infection
4. Thromboembolism : hemiplegia

❖ **E.g. a case of rheumatic heart disease, double mitral, tricuspid regurge with biventricular enlargement. The patient has right & left heart sided decompensation & complicated by atrial fibrillation (AF)**

## Summary Of Cardiac Examination

### ○ General examination:

| | | | |
|---|---|---|---|
| • Vital signs | • General overview | • Systemic overview | • Other systems except that of local exam |

### ○ Local examination : cardiac examination

#### I. Combined inspection & palpation

| | | |
|---|---|---|
| A. Precordial bulge | B. Veins & scars | C. Shape of the chest |

D. Pulsations :

1. Apex pulsation : comment on SACT.R

| | | | | | | |
|---|---|---|---|---|---|---|
| ○ Site | ○ Area | ○ Character | ○ Thrill & Timing | ○ Rhythm | ○ Rate | ○ Rocking |

| | | |
|---|---|---|
| 2. Suprasternal pulsation | 4. 1st aortic area | 5. Pulmonary area |
| 3. Epigastric pulsation | 6. Right parasternal pulsation | 7. Left parasternal pulsation |

#### II. Percussion

##### A. By heavy percussion

| | | |
|---|---|---|
| 1) Hepatic dullness by tidal percussion | 3) Upper border of the heart: | |
| 2) Right border of the heart | • 1st aortic area | • Pulmonary area |
| | 4) Left border of the heart: | |
| | • Apex | • Waist of the heart |

##### B. By light percussion

| | |
|---|---|
| • Bare area of the heart | • Lower third of sternum |

#### III. Auscultation

1. Heart sounds : S1, S2, S3, S4
2. Additional heart sounds : systolic clicks & opening snap
3. Murmur : comment on SACT.R

| | | | | | |
|---|---|---|---|---|---|
| ○ Site of maximum intensity | ○ Area of propagation | ○ Character | ○ Timing | ○ Type : organic or functional | ○ Relation to position, expiration & exercise |

4. Other heart sounds : (Pericardial rub, pericardial knock, crepitations & metallic click)

# SCHEME OF CARDIOLOGY

## ❖ By history : أول شكوى

- ♥ Dyspnea → MS
- ♥ Irregular palpitation → AF with MVD (MS > MR)
- ♥ Low COP ± chest pain → AS
- ♥ Regular palpitation + chest pain → AR
- ♥ Systemic congestion → TR with MVD (MS > MR)

## ❖ By general examination:

- ♥ Blood pressure : ↑ systolic \ ↓ diastolic → volume > 60 mmHg → AR ( دور على باقي ال signs )
- ♥ Pulse : irregular → AF with MVD (MS > MR)
- ♥ Orthopnea → MS
- ♥ Edema LL → TR with MVD (MS > MR)
- ♥ Tall stature → Marfan syndrome or marfanoid
- ♥ Stunted growth → congenital heart disease
- ♥ Cyanosis & clubbing → F4

## ❖ By Local examination:

### I. Auscultation :

- ○ ابدأ السمع في ال 2nd aortic area وإسأل نفسك في murmur ولا لأ :

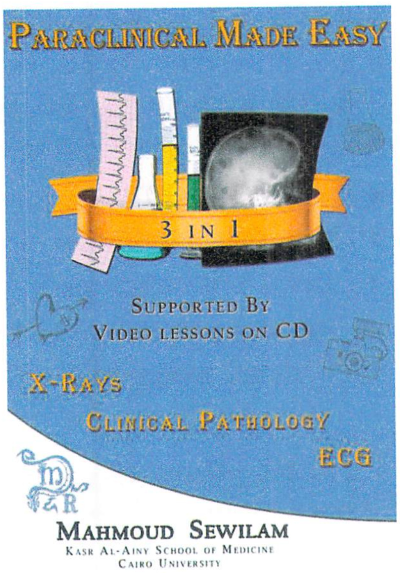
| A. لو مش سامع murmur :<br>← روح على ال apex أكيد هتلاقي murmur:<br>اعمله timing مع الcarotid | B. لو انته سامع Murmur , اعمله timing مع ال carotid |
|---|---|
| 1) If diastolic → MS (localized) | 1. If diastole : AR |
| 2) If systolic → MR (anterior leaflet) → axilla | 2. If systole : → تحرك بالسماعة<br>• ↑ towards carotid & A1 →AS<br>• ↑ towards apex → MR<br>• ↑ towards pulmonary area → PS<br>• ↑ towards tricuspid → TR |

### II. Inspection & palpation: مشيها مع التشخيص

### III. Percussion: مشيها مع التشخيص

# INVESTIGATIONS OF A CARDIAC CASE

## I. Non-Imaging:


PARACLINICAL MADE EASY
3 IN 1
SUPPORTED BY
VIDEO LESSONS ON CD
X-RAYS
CLINICAL PATHOLOGY
ECG
MAHMOUD SEWILAM
KASR AL-AINY SCHOOL OF MEDICINE
CAIRO UNIVERSITY

1. **ECG:**

- **Types of ECG:**

- Resting ECG العيان نايم
- Exercise ECG بعجلة
- Ambulatory ECG يتحرك بيه

- **Value :**

○ To detect arrhythmia e.g. AF or extrasystole

○ Chamber enlargement (hypertrophy) rather dilatation due to ischemia

☠ N.B.: you have to know ECG changes of the following diseases:

- Chamber hypertrophy, angina , myocardial enlargement & pericarditis

→ For more details about imaging, ECG, Clinical pathology, see Paraclinical Made easy for the author.

2. **Cardiac enzymes:** CPK, LDH, CPK-MB, Troponins; they increase in myocardial infarction
3. **Blood culture :** for infective endocarditis
4. **Blood tests** for identification of risk factors e.g. lipid profile for dyslipidemia
5. **Acute phase reactants** for general evidence of tissue damage in MI : leukocytosis, ↑ESR, ↑CRP

## II. Imaging:

1) **Chest X-ray:**

A. **Plain X-ray :** to detect chamber enlargement & pulmonary congestion,, pleural effusion valve calcification & prosthetic valve

B. **Contrast X-ray:** barium swallow in lateral view in MVD to detect left atrial enlargement : indention or posterior displacement of esophagus

→ For more details, see Paraclinical Made easy for the author.

2) **Ultrasonography (US):** ( أشعة تليفزيونية (موجات فوق صوتية )

❖ **Technique:**

A. **Intravascular US:** جهاز الموجات فوق الصوتية لأوعية الدم

B. **Echocardiography → anatomy** فحص القلب بالموجات فوق الصوتية (أشعة الإيكو) أو تخطيط صدى القلب

♥ **Types of echocardiography:**

| | | |
|---|---|---|
| ○ Transthoracic echocardiography | ○ Transesophageal echocardiography | ○ Stress echocardiography |
| ○ Contrast echocardiography | ○ Doppler echocardiography | |
| ○ Dobutamine induced echocardiography (pharmacological stress) | | |

♥ **Value of Transesophageal echocardiography (TEE): indicated in all cardiac cases**

| | | | |
|---|---|---|---|
| ▪ Thrombi : AF | ▪ Vegetations : SBE | ▪ Aortic aneurysm | ▪ Valve replacement especially mitral & aortic |

C. **Doppler US →** blood flow & pressure فحص القلب بالدوبلر

D. **Echo Doppler** فحص القلب بالإيكو دوبلر

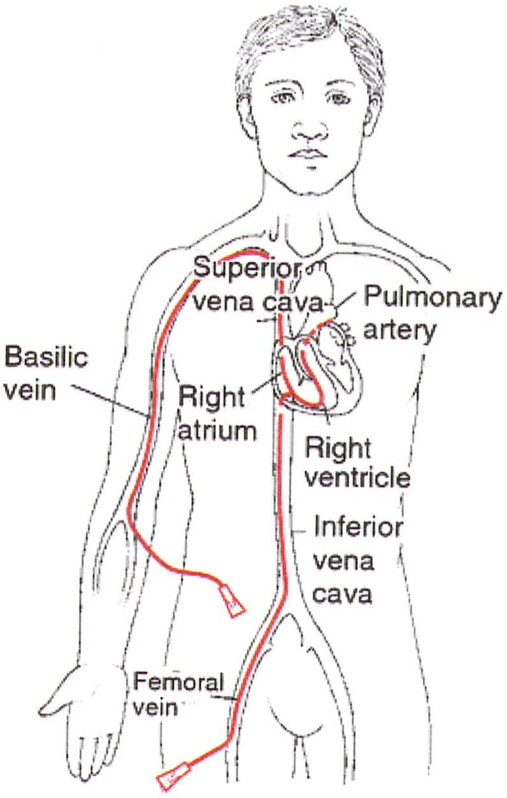
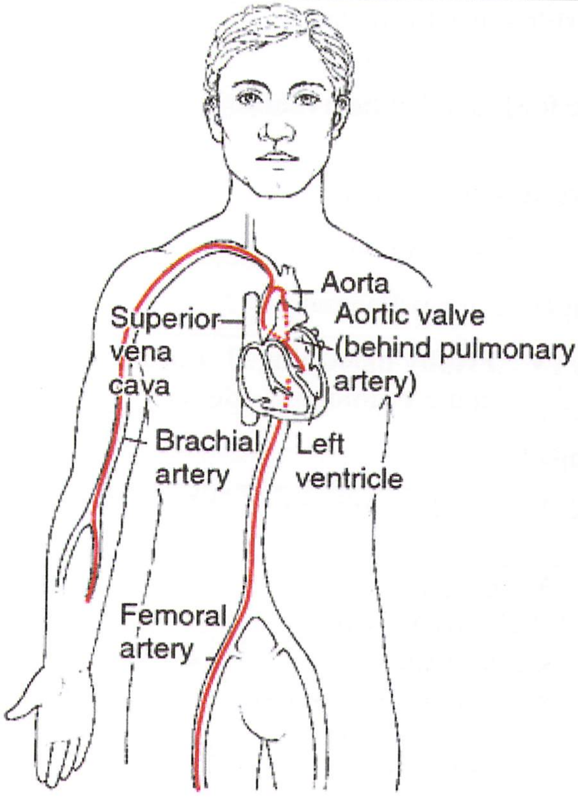
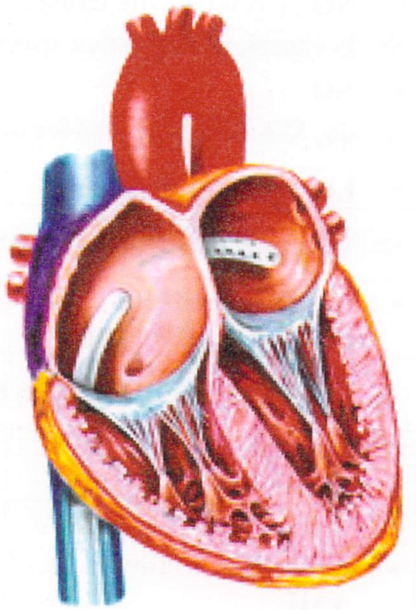
- **Value** : to detect

| | | |
|---|---|---|
| ○ Valvular affection; which valve, what lesion & { severity of the lesion = indications of surgery} | | |
| ○ Chamber enlargement | ○ Congenital abnormalities | ○ Intracavitary masses; thrombus & tumour |
| ○ Vegetation of endocarditis | ○ Myocardial function by ejection fraction | ○ Pericardial disease; effusion & constrictive pericarditis |

3) **Pulmonary angiography** for pulmonary embolism

4) **CT & MRI:** in dissecting aorta

## 5) Cardiac catheterization = coronary angiography:

| a. Right sided catheter: | b. Left sided catheter: | c) Trans-spetal technique |
|---|---|---|
|  |  |  |

Superior
vena cava
Pulmonary
artery
Basilic
vein
Right
atrium
Right
ventricle
Inferior
vena
cava
Femoral
vein
Aorta
Aortic valve
(behind pulmonary
artery)
Superior
vena
cava
Brachial
artery
Left
ventricle
Femoral
artery

- ❖ **Technique :** Wire : long, malleable, very thin, hollow , radio opaque
- ❖ **Approach :**

| A. Right sided catheter: | B. Left sided catheter: |
|---|---|
| • Any vein → RA → Tricuspid valve → RV → pulmonary valve → pulmonary artery | • Artery → aorta →aortic valve → left ventricle only |
| **C. Mitral valve : trans-spetal technique : to reach LA:**<br>• Right sided catheter : right atrium → pierce interatrial septum (artificial ASD) → left atrium → mitral valve | |

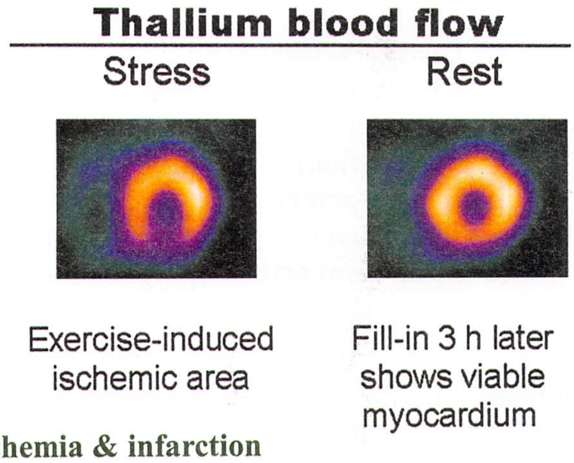
- ○ **Indications:**

A. **Measure the pressure :** pulmonary hypertension, pressure gradient
B. **Take a blood sample :** for oxygen saturation to diagnose shunt
C. **Injection of contrast :** cin-angiocardiography

- ○ **Value:**

| ○ As US | ○ Coronary angiography. |
|---|---|

## 6) Cardiac scan = Isotopic studies= Radionuclide imaging (radioactive Thallium 201):


Thallium blood flow
Stress
Rest
Exercise-induced
ischemic area
Fill-in 3 h later
shows viable
myocardium

- ○ Diagnosis of myocardial ischemia & infarction
- ○ Thallium is taken by healthy myocardium & not by the ischemic myocardium
- ○ Ischemic area appears as a filling defect (cold spot) at exercise & disappears at rest
- ○ infarcted area appears as a filling defect (cold spot) at rest

# CLINICAL DISCUSSION

❖ Is orthopnea specific for left sided heart failure ?

- NO , ( refer to the causes in general chapter)

❖ Is exertional dyspnea specific for left sided heart failure ?

- NO

❖ So, What are the causes of exertional dyspnea ?

| | | |
|---|---|---|
| • Left side heart failure | • COPD | • Pleural effusion |

❖ What are the causes of hemoptysis in cardiac patient ?

| | | |
|---|---|---|
| • **Frank hemoptysis** : MS , pulmonary infarction | • **Frothy blood tinged sputum** : in acute Pulmonary edema | • **Blood streaked mucopurulent sputum** : in pulmonary infection |

❖ What are the causes of syncope?

| A. Cardiac syncope : due to low CO | B. Vasomotor syncope | C. Cerebral syncope | D. Orthostatic syncope : "postural syncope" |
|---|---|---|---|
| • AS<br>• Acute heart failure e.g. AMI<br>• Arrhythmias (tachy or brady)<br>• Adams stokes attack | • **Vasovagal attack** : exposure to fear<br>• **Carotid sinus syndrome** : stimulation of hypersensitive carotid sinus | • Verebrobasilar TIAs<br>• Hypertensive encephalopathy | • Autonomic neuropathy (DM),<br>• Hyponatremia<br>• Lumbar sympathectomy<br>• Drugs e.g. Ganglion blockers |

❖ What are the cardiac causes of chest pain ?

| | | |
|---|---|---|
| ▪ **Myocardium** : angina, Myocardial infarction | ▪ **Pericardium**: Pericarditis, Pericardial effusion | ▪ **Endocardium** : mitral valve prolapse |
| ▪ **Pulmonary** infarction | ▪ Dissecting aneurysm of **aorta** | ▪ Pain of cardiac **neurosis** |

❖ What are the causes of angina pain in young age ?

| | | |
|---|---|---|
| • Aortic valve disease | • Mitral valve Prolapse | • Prinzemetal angina |
| • Vasculitis | • Familial hypercholesterolemia | |

❖ What are the causes of pressure symptoms of cardiac patient ?

- **Left Atrium enlargement**, pericardial effusion, aortic aneurysm

❖ What do you know about Ortner syndrome ?

- **Hoarseness of voice due to Recurrent laryngeal nerve palsy** from **enlarged left atrium** due to **mitral stenosis**

❖ What is the origin of emboli that patient may get & their effects?

| ❖ Symptoms of systemic embolization: | |
|---|---|
| ❖ Origin : | ❖ Effects : |
| 1) **Atrium:** Left atrium in MS especially when AF develops<br>2) **Valve:** mitral & aortic valves in SBE, prosthetic valves in calve replacement<br>3) **Ventricle:** Left Ventricle mural thrombus in Myocardial infarction<br>4) **Vessel:** aortic atherosclerotic plaque in atherosclerosis | 1. **Middle cerebral artery** : embolic hemiplegia<br>2. **Central retinal artery** ; sudden blindness<br>3. **Coronary artery** : chest pain (myocardial infarction)<br>4. **Superior mesenteric artery** : abdominal pain (intestinal obstruction)<br>5. **Splenic artery** : pain in Lt hypcchondrium<br>6. **Renal artery** : painless hematuria<br>7. **Peripheral artery** : pulseless, pallor, pain, paresthesia & paralysis |

❖ What are the palpable sounds you can feel?

| | | | |
|---|---|---|---|
| • **Palpable S1** in slapping apex in MS | • **Palpable 2nd (A2)** heart sound in syphilitic AR, hypertension & COA | • **Palpable 2nd (P2)** heart sound in pulmonary hypertension = grade 3 MS | • **Palpable 3rd or 4th** heart sound : gallop |
| • Palpable **rub** in pericarditis | | | |

### ❖ What are the causes of gynaecomastia in cardiac patient ?

- Chronic hepatic congestion
- Drugs (Spironolactone, digitalis, cimetidine)

### ❖ What are the causes of nausea & vomiting in a cardiac patient ?

| | | |
|---|---|---|
| • Systemic venous congestion | • Digitalis toxicity | • Acute myocardial infarction |

### ❖ What are the inherited diseases with cardiac complaint?

| | | |
|---|---|---|
| • Down syndrome : VSD | • Turner syndrome : Coarctation of aorta | • Marfan syndrome : aortic incompetence |
| • Myotonia & Friedriech ataxia : cardiomyopathy | • Familial hypercholesterolemia | |

### ❖ What are the differential diagnosis of right lung base dullness ?

| A. Supradiaphragmatic causes :<br>-ve TP | B. Diaphragmatic causes :<br>reversed TP | C. Infradiaphragmatic causes :<br>+ ve TP | D. Chest wall causes : |
|---|---|---|---|
| ○ **Basal lung disease :** consolidation, bronchiectasis, collapse, fibrosis & cavitation<br>○ **Basal pleural disease :** effusion, empyema, hydropneumothorax & pleural Fibrosis<br>○ **Cardiac causes :** dextrocardia, huge pericardial effusion & huge cardiomegaly | ○ Diaphragmatic paralysis | ○ Subphrenic abscess, amebic liver abscess<br>○ Hepatomeglay, abdominal tumors<br>○ Marked ascites, pregnancy | ○ Tumors of skin, subcutaneous tissue, muscles & ribs |

### ☠ What are the Characters of cardiac edema?

<table>
<tr><td>❖ Occurs in the dependent parts of the body :<br>▪ Ankle oedema : in ambulant patient<br>▪ Sacral oedema : in bed ridden pateints</td><td>❖ Bilateral : but one side may be affected more <em>(unequal edema)</em> due to :<br>▪ Deep venous thrombosis (DVT)<br>▪ Postural, in patients sleeping on one side</td></tr>
<tr><td>❖ Pitting</td><td>❖ Associated with other features of cardiac diseases</td></tr>
<tr><td colspan="2">❖ Oedema of lower limbs always precedes appearance of ascites except in two conditions in which ascites occurs first Ascites precox (ascites before edema) occur in :<br>▪ Tricuspid valve disease : TR - TS<br>▪ Pericardial disease : pericardial effusion & constrictive pericarditis</td></tr>
</table>

### ❖ What is the difference between rheumatic fever, rheumatic heart & rheumatic activity?

- **Rheumatic fever :** is the first attack of rheumatic fever
- **Rheumatic heart :** it is the scar left by the rheumatic in the form of valvular affection
- **Rheumatic activity:** it is rheumatic fever on top of rheumatic heart or the attack of rheumatic other than the 1st attack.

## ❖ What is the mechanism of PND; paroxysmal nocturnal dyspnea?

- **It's pathognomonic to Left side failure:**
- **Mechanism :**

A. **During sleep** → ↑ parasympathetic and ↓ sympathetic tone leading to :

- Inhibition of respiratory center → hypoxia with hypercapnia till a critical level at which there is sudden stimulation of respiration.
- Bradycardia, decreased contractility leading to decreased cardiac output leading to exaggeration of heart failure.

B. **It occurs after 1-2 hours,** the time needed for redistribution of oedema fluid from lower limds to the lungs

## ❖ What is the pathogenesis of cardiac dyspnea ?

**A. Mechanical factors :**

1. ↓ alveolar compliance secondary to interstitial oedema
2. ↓ lung compliance secondary to concomitant pleural effusion & elevated diaphragm (ascites, enlarged liver)
3. Oedema of bronchial mucosa

**B. Nervous factors :**

| 1. Activation of Herring – Breuer reflex: | 2. Churchill- cope reflex: |
|---|---|
| • It is a normal slowly adapting reflex where impulses arise from stretch receptors, in the terminal air passages at the end of inspiration leading to reflex inhibition of inspiration & passive relaxation, i.e. expiration<br>• In left side failure, interstitial oedema activates this reflex leading to rapid shallow respiration | • It abnormally rapid adapting reflex which occurs only in pulmonary congestion with congested pulmonary vessels that stimulate J-receptors (Juxta-alveolar receptors) leading to reflex stimulation of respiratory center in brain stem |

**C. Chemical factors:**

- Hypoxia, hypercapnia, acidosis are stimulant to respiration.

1. Hypoxia secondary to pulmonary congestion
2. Hypercapnia : occurs in severe acute pulmonary congestion i.e. acute pulmonary oedema
3. Acidosis: secondary to tissue hypoxia leading to lactic acidosis

## FREQUENTLY ASKED QUESTIONS FOR MID & END ROUND EXAM

**Test yourself!**

1. What are the cardiac causes of jaundice?
2. What are the cardiac causes of fever?
3. What are the cardiac causes of clubbing?
4. Define apex the heart?
5. What are causes of out displacement of cardiac apex?
6. What shifts the apex of the hear “out & down”?
7. Systolic bulge of the apex is caused by?
8. Systolic retraction of the apex is caused by what?
9. What are the differences between localized & diffuse apex?
10. What are the characters of the apex?
11. What are causes of thrill over the apex?
12. What are the causes of left parasternal pulsation?
13. What is the cause of pulmonary pulsation?
14. What is meant by diastolic shock?
15. What are the causes produce thrill on cardiac base?
16. What are the causes of epigastric pulsations?
17. What are the causes of aortic pulsation?
18. What is the most important cause of hepatic pulsation ?
19. What is the difference between systolic & presystolic hepatic pulsation?
20. What are the causes of invisible – impalpable apex?
21. Causes of dullness outside right sternal border (right border of the heart)?
22. How to differentiate between pericardial effusion & pulmonary dilatation as a cause of dullness in pulmonary area
23. What are causes of dullness outside apex?
24. What are the causes of enlarged bare are with stony dullness?
25. What is the extent of bare area?
26. What is meant by obliterated waist?
27. What is meant by tidal percussion?
28. What is meant by reversed tidal percussion?
29. What are causes of accentuated 1$^{st}$ heart sound?
30. What are causes of variable S1?
31. What are the causes of pansystolic murmur?
32. What are causes of ejection systolic murmur?
33. What are the causes of diastolic murmur?
34. What is the Carvallo’s sign?
35. What are the grades murmur?
36. What are the peripheral signs of TR?
37. What are the peripheral signs of aortic regurge?
38. Investigation of cardiac case?
39. What are signs of right ventricular enlargement?
40. What are signs of left ventricular enlargement?
41. What are the causes of volume overload on LV?
42. What are the causes of pressure overload on LV?
43. What are the Causes of right ventricular enlargement?
44. What are the causes of pulmonary hypertension?
45. What are the signs of pulmonary hypertension?
46. What is the definition of rheumatic fever?
47. What are criteria of rheumatic fever?
48. How to diagnose rheumatic fever?
49. What is the difference between rheumatic fever, rheumatic heart & rheumatic activity?
50. What is the treatment of rheumatic fever?
51. What are the complications of rheumatic heart disease (MS, AS, MR .... )?
52. What is the treatment of rheumatic heart disease?
53. All questions answered in the clinical discussion are very important.

## O.S.C.E QUESTIONS

- Inspect & palpate heart
- Inspect & palpate pericordium
- Inspect & palpate the apex
- Percuss & auscultate the heart
- Comment on the base of the heart
- Comment on the apex
- Search for signs of ventricular enlargement
- Peripheral signs of AR
- Auscultate heart (AS, AR, MS, MR, DM, metallic sound)

# Mitral stenosis

- **Personal history:**
- **Complaint :**
- Shortness of breath of one week duration.
- **History of present illness:**
  - The condition started 15 years duration by gradual onset and progressive course of **dyspnea**. The patient experienced **exertional dyspnea** on less than ordinary effort, on climbing the 1st floor not associated with orthopnea or PND. The patient sought medical advice, investigated by chest X-ray, ECG and ECHO, diagnosed as tight mitral stenosis and treated by mitral valvotomy.
  - The patient remained symptom-free for 1 year after operation then he developed **exertional dyspnea** again on ordinary effort not associated with orthopnea or PND. This dyspnea was associated with gradual onset of rapid **irregular palpitation** increased with exertion.
  - The patient sought medical advice, investigated by chest X-ray, ECG and ECHO, and treated digitalis and lanoxin.
  - The patient was quite well till one week ago when he re-developed **exertional dyspnea** again on ordinary effort not associated with orthopnea or PND.
  - No symptoms of **low COP.** No symptoms of **systemic congestion**.
- **Past history:**
  - There is past history of **rheumatic fever** Since he was 14 years old, manifested by fever and arthritis, investigated by CBC, ESR and ECHO, treated by aspirin and the condition relieved and he was advised to take long acting penicillin for life and it was recurrent several times.
  - No DM no HPN. No past history of operations or drugs.
- **Family history**
  - No consanguinity, No common diseases in the family, No similar condition in the family.
- **General exam**
  - **Temperature**: 37°
  - **Blood pressure:** 110/70.
  - **Pulse: markedly** irregular pulse, 75/minute, variable volume, pulsus deficit>10, vessel wall is not felt, equal on both sides with intact peripheral pulsation radio-femoral delay with .
  - Average **built.** No **cyanosis, pallor or jaundice.**
  - No special **decubitus** (the patient is lying free flat comfortable in bed).
  - No **oedema L.L** , No **clubbing. Neck veins** are pulsating not congested.
- **Local exam**

1. **Inspection and palpation**
   - Left inframammary thoracotomy scar of mitral valvotomy. Normal shape of chest.
   - No dilated veins on chest wall. No pericordial bulge.
   - Regarding pulsations :
   - **Apex:**
     - Markedly irregular apex, 90/min, lies in left 5th space MCL, localized, slappy in character, with no thrill and no rocking movement.
   - Otherwise, apart from weak epigastric pulsations originating from aorta, no other visible or palpable pulsations.
2. **By palpation only :**
   - **Pulsations** the same as above.
   - **Palpable sound:** there is palpable 1st heart sound (slappy apex) but no diastolic shock.
   - **No thrill** either on apex, left parasternal area or on base.
3. **Percussion :**
   - **Hepatic dullness** in the Right 5th space MCL, no dullness in the right parasternal area, both aortic and pulmonary areas are resonant, preserved waist of the heart, no dullness outside the apex, lower end of the sternum is impaired note with dull bare area.
4. **Auscultation**
   - **1st sound** accentuated.
   - Diastolic rumbling **murmur**, localized over the apex, increased on lying in the left lateral position, it's organic, grade III/VI with no thrill.
   - **Opening Snap** may be heard!!

- **N.B :**
  - ○ **In A.F.:** Notice the following difference: Variable 1st heart sound with no presystolic accentuation of the murmur.

**○ Discussion :**

? **What is your diagnosis ?**

- **Rheumatic heart disease, in the form of isolated mitral restenosis, the patient is compensated and complicated by AF.**

? **Why Rheumatic?** → from history.

? **Why MS?** → **from history, exam (irregular pulse, scar, slappy apex, auscultation).**

? **Why Compensated?** → **from (absence of symptoms and signs of systemic congestion).**

? **Why Complicated by AF?** → **(irregular pulse with marked irregularity and pulsus deficit >10).**

? **Why is S1 accentuated in the patient with MS?**

🕮 **Fibrosis of the mitral cusps.**

🕮 **Forcible closure of the mitral cusps :They are displaced downwards due to high LA pressure & The mitral valve is opened as wide as possible during the diastole.**

? **In which condition is S1 diminished over the apex in MS ?**

🕮 **In cases of MS which are associated with MR (double mitral), or in cases of calcified mitral valve**

? **What additional sound can you hear in MS ?**

🕮 **Mitral opening snap:** وتشرحها للدكتور بالتفصيل

? **How can you prove calcification of the mitral valve by one single investigation ?**

🕮 **Chest X ray.**

? **When can you find MS with no murmur ?**

🕮 **Silent Mitral Stenosis (MS with no murmur) due to:**

A. **High LV pressure: LVF.**

B. **Low LA pressure:**
   - ○ **Severe pulmonary hypertension.**
   - ○ **RVF.**

C. **In association with ASD.**

? **Can you hear also S3 over the mitral area in this patient ?**

🕮 **No, because there is no LVF in pure MS, & there is no volume overload over the LV in pure MS**

? **So, when can you hear S3 over the mitral area in MS ?**

🕮 **In cases of MS which are associated with MR (double mitral)**

🕮 **In cases associated with aortic valve disease: AR & AS**

? **If the patient develops AF as a complication, what will you find clinically?**

🕮 **See before.... (effect of AF on MS)**

? **What other complications of MS do you know ?**

🕮 **Revise the complications from your theoretical book**

? **What other causes of MS do you know ?**

🕮 **Revise the causes from your theoretical book**

? **Why is infective endocarditis not common in MS ?**

🕮 **Due to weakness of the blood jet passing from the LA to the LV ( infective endocarditis needs a high pressure gradient to occur ).**

? **How could you differentiate between organic MS & Austin flint (relative MS) in AR?**

❖ **Organic MS: mid diastolic murmur with presystolic accentuation , ↑ S1, opening snap, diastolic thrill**

❖ **Austin flint in AR: mid diastolic murmur on apex with normal S1, no opening snap, no thrill.**

? **Why is PND ( and acute pulmonary oedema ) not common in MS ?**

🕮 **Because MS is a gradual process allowing time for protective mechanisms to take place to ↓ further pulmonary congestion:**

A. **Reflex vasoconstriction of pulmonary arteries.**
B. **Anastomosis between pulmonary & bronchial veins**
C. **Development of interstitial pulmonary barrier.**
D. **Thickening of the walls of pulmonary vessels.**

? What is meant by tight MS & what is its importance ?

🕮 Tight MS is an indication for surgery& is diagnosed by:

🕮 According to the stage: Stage II with dyspnea more than grade II, or Stage III , or Stage IV

🕮 According to the echocardiography: Valve area less than 1 $cm^2$

? How would you proceed to manage this case?

### A. Investigations

? What do you expect to find in the ECG of a patient with MS ?

1. ECG :
   - ○ LA enlargement ( P mitrale : m shaped P wave )
   - ○ Pulmonary hypertension ( P pulmonale : peaked P wave )
   - ○ Arrhythmia (AF)

? What do you expect to find in the chest x-ray of a patient with MS ?

2. CXR for chamber enlargement.
   - ○ LA enlargement ( lateral view with barium), Pulmonary congestion, Dilated pulmonary artery, RVE. & Calcification of mitral valve.

? What is the most important investigation of MS ?

3. Echocardiography (investigation of choice, the most diagnostic, the ,most important) & Echo Doppler: for anatomical, functional, aetiological, diagnosis and for detection of complication.

? How to calculate mitral stenosis index ?

4. Catheterization & angiography:
   - ○ Chamber enlargement.
   - ○ Mitral stenosis index = COP/LAP x 100 = 5/5 x 100 = 100% ( < 25 % is tight MS )

### B. Treatment

a) Medical treatment
   - ○ Prophylaxis against IE & rheumatic activity.
   - ○ Treatment of complications e.g. HF , AF , infections ...

b) Interventional (ballon mitral valvoplasty).

c) Surgical (valvotomy or valve replacement).

? What would you add to your treatment if the patient with MS presented also with AF ?

🕮 In addition to treating AF by anti – arrhythmic drugs, I would like to add anticoagulants for life

? What kind of surgery would you do for this patient with stenosed mitral valve ?

🕮 Types of operations:
   - ○ Mitral commissurotomy: closed or open.
   - ○ Valve replacement: By a prosthesis (tissue or synthetic).

? What are the indications of valve replacement of that patient?

❖ Calcification

❖ Associated MR

❖ Tight MS ( MS Index < 25 % , surface area < $1cm^2$ or severe manifestations)

❖ Recurrent stenosis after balloon dilatation or valvotomy .

? What are the surface anatomy of mitral valve?

○ Site : between the LA & LV .

○ Surface area : 4 - 5 cm2 , if < 1 cm2 → tight MS.

○ Shape of mitral orifice : rounded or oval during diastole & slit like during systole.

○ Axis : downward , forward & to the left.

○ Components:

– Fibrous ring.

– 2 cusps ( anteromedial & posterolateral)

– 2 papillary muscles : arise from the ventricle, to control the cusps movement.

– Chordae tendinae : arise from papillary muscles to both cusps.

# Aortic stenosis

### ❖ Personal history:….

### ❖ Complaint:

- **Chest pain of ten days duration.**

### ❖ History of present illness:

- The condition started ten days ago by retro-sternal constricting **chest pain** radiated to the left shoulder, increased b exercise, relieved by rest and lasted for 10 minutes. The patient sought medical advice, admitted to Hospita investigated by chest X-ray, ECG and ECHO and advised to take long acting penicillin for life and sublingua nitrates during attacks of chest pain.
- No **syncope**
- No symptoms of **pulmonary congestion.**

### ❖ Past history

- There is past history of **rheumatic fever** since he was 14 years old, manifested by fever and arthritis, investigated b CBC, ESR and ECHO, treated by aspirin and the condition relieved and he was advised to take long actin penicillin for life and it was recurrent several times.
- **20 years ago**, the patient suffered from dizziness and blurring of vision which he sought medical advice investigated by ECG and X-ray and received treatment in the form of sublingual tablet.
- No DM no HPN.
- No past history of operations or drugs.

### ❖ Family history

- No consanguinity.
- No common diseases in the family.
- No similar condition in the family.

### ❖ General exam

- **Temperature :** 37°
- **Blood pressure** : 110/70
- **Pulse :** regular pulse, 75 /minute, average volume, no special characters, vessel wall is not felt, equal on both side with intact peripheral pulsations with no radio-femoral delay.

→ **Notice in some cases of AS the pulse is too weak to be felt.**

- Average **built.**
- No **cyanosis, pallor or jaundice.**
- No special **decubitus** (The patient is lying free flat comfortable in bed).
- No **oedema L.L**
- No **clubbing**
- **Neck veins** are pulsating not congested.

### ❖ Local exam

#### 1. Inspection and palpation .

- Normal shape of chest.
- No dilated veins.
- No scars of cardiac surgery.
- No pericardial bulge.
- Regarding pulsations :

❖ **Apex:** Regular apex, 75/min, lies in left 5th space MCL, localized, heaving in character, with no thrill and rocking movement

❖ Otherwise, apart from weak epigastric pulsations originating from aorta, no other visible or palpable pulsations.

#### 2. By palpation only :

- **Thrill** over the 1st aortic area, propagated to the neck (In some cases, this thrill is not present).
- **Pulsations** the same as above.
- **Palpable sound:** there is no palpable 1st heart sound or diastolic shock.

### Percussion :

- **Hepatic dullness** in the Rt. 6th space MCL, no dullness in the Rt. parasternal area, both aortic and pulmonary areas are resonant, preserved waist of the heart, no dullness outside the apex, lower end of the sternum is impaired note with dull bare area.

### Auscultation

- **2nd sound** muffled.
- Systolic harsh **murmur,** maximum intensity over the 1st aortic area propagated to the neck and the apex, increased on setting leaning forward and holding breath in full expiration, it's organic of grade IV/VI with associated thrill (The thrill may not be present and the murmur of grade III/IV).
- **Ejection click** may be heard !!

## ○ Discussion :

**What is your diagnosis?**

- **Rheumatic heart disease, in the form of isolated aortic stenosis, the patient is compensated and not complicated.**

**Why Rheumatic?** **→ from history.**

**Why AS?** **→ from history, exam (Systolic thrill over the 1st aortic area, data of auscultation).**

**Why Compensated?**

- **From (Absence of symptoms and signs of pulmonary congestion) as No signs of LVF: apical gallop, pulsus alternans, bilateral basal crepitations.**
- **No complication detected**

**What are the causes of AS that you know?**

- **Revise them from your theoretical book**

**What are the most common causes of AS ?**

- **Rheumatic Fever, Congenital, Calcific.**

**How could you differentiate between the 3 main causes of AS ?**

| | A. Congenital | B. Rheumatic | C. Calcific |
|---|---|---|---|
| ○ Age | ▪ Young | ▪ Middle | ▪ Old |
| ○ History of RF | ▪ Absent | ▪ Present | ▪ Absent |
| ○ Type | ▪ Valvular or subvalvular or supravalvular | ▪ Valvular | ▪ Valvular |
| ○ Associations | ▪ Congenital anomalies | ▪ Other valvular lesions | ▪ Atherosclerosis |

**Which type of the lesion in rehurmatic AS, valvular, or subvalvular or supravalvular?**

- **Valvular**

**How to prove that is valvular ?**

- **By presence of Ejection click**

**Why is S2 weak in the patient with AS?**

- **Due to presence of low pressure over the aortic cusps which will close weakly**

**In which condition is S2 normal in AS ?**

- **In cases of AS which are associated with AR (double aortic).**

**What are the signs of severity of AS?**

- **Slow rising pulse**
- **Narrow pulse pressure**
- **Fourth heart sound**
- **Heart failure**
- **History of collapse**

**What additional sound can you hear in AS ?**

- **Systolic ejection click:** **due to opening of the rigid cusps.**

? **What do you expect to find in examination of the pulse in AS ?**

🕮 Pulsus parvus et tardus (plateau pulse): rises slowly, of small volume, returns slowly.

🕮 Pulsus bisferiens: bifid pulse occurring in double aortic lesion with predominant AR.

? **What can you hear over the mitral area in this patient ?**

🕮 S4 !!

🕮 Propagated murmur of aortic stenosis.

? **What can you hear over the pulmonary area in this patient ?**

🕮 Reversed splitting of the second heart sound.

? **What causes angina in AS ?**

🕮 Reduced coronary blood flow: due to low CO & shortened diastole.

🕮 Left ventricular hypertrophy: increases the myocardial $O_2$ demands.

🕮 Associated coronary aterosclerosis: especially in calcific AS.

? **What other complications of AS do you know ?**

🕮 Revise them from your theoretical book

? **What type of heart failure can occur in AS, left-sided or right-sided?**

🕮 Left-sided heart failure due to left ventricular failure & pulmonary congestion.. However, Right-sided heart failure can also occur late secondary to left-sided heart failure.

? **How would you proceed to manage this case??**

**I. Investigations**

? **What do you expect to find in the ECG of a patient with AS ?**

1. **ECG: LVE.**

? **What do you expect to find in the chest x-ray of a patient with AS ?**

2. **CXR for chamber enlargement.**

- LVE.
- Post stenotic dilatation
- Pulmonary congestion.
- Calcification.

? **What is the most important investigation of AS ?**

3. **Echocardiography (investigation of choice, the most diagnostic the most important)** to
   - Detects the severity of valve lesion ( $< 0.8\ cm^2 \rightarrow$ severe AS )
   - Chamber enlargement.
4. **Catheterization:**

- Detects the severity (it can measure the pressure gradient across aortic valve)

**II. Treatment**

**A. Medical treatment**

- Beta blockers for angina
- Prophylaxis against IE & rheumatic activity.
- Treatment of complications e.g. HF , AF , infections ...

**B. Interventional (ballon aortic valvoplasty).**

**C. Surgical (valvotomy or valve replacement).**

? **What are the indications of valve replacement of that patient?**

🕮 Indications of surgery in AS: (aortic valve replacement):

A. Presence of symptoms.

B. Pressure gradient more than 50 mmHg.

C. Valve area less than 0.8 cm2 ( normally: 3-4 cm2 ).

? **What are the surface anatomy of aortic valve?**

- 3 semilunar cusps attached to a fibrous valve ring .
- In about 1 % of individuals , only 2 cusps are present ( Bicuspid aortic valve ).
- Surface area is about 3 – 4 cm2 .
- **Note**

- You may find peripheral signs of aortic regurge with signs of aortic stenosis .... this mean you are dealing with double aortic lesion.

# Aortic Regurge

❖ **Personal history: ….**

❖ **Complaint:**

- **Awareness of heart beats, one week duration.**

❖ **History of present illness:**

- The condition started 10 years ago by gradual onset, progressive course of rapid regular **palpitation** increased with exertion. The patient sought medical advice, investigated by chest X-ray, ECG and ECHO and the patient was advised to be operated but unfortunately, the patient refused the operation.
- Six years later, the patient developed retrosternal constricting **chest pain** radiated to the left shoulder increased by exertion, relieved by rest and oral treatment and lasted for 5 minutes. The patient sought medical advice, investigated by chest X-ray, ECG and ECHO, treated by sublingual nitrate.
- The patient was quite well till one week ago when he re-suffered from gradual onset, progressive course of rapid regular **palpitation** increased with exertion.
- No symptoms of **pulmonary congestion**
- No symptoms of **low COP**

❖ **Past history**

- There is past history of **rheumatic fever** since he was10 yearsold, manifested by fever and arthritis, investigated by CBC, ESR and ECHO, treated by aspirin and the condition relieved and he was advised to take long acting penicillin for life with no recurrence.
- No DM no HPN.
- No past history of operations or drugs.

❖ **Family history**

- No consanguinity
- No common diseases
- No similar condition

❖ **General exam**

- **Temperature** : 37
- **Blood pressure** : 150/50
- **Pulse**: Regular pulse, 75 /minute, big pulse volume,water hammerpulse, vessel wall is not felt, equal on both sides with intact peripheral pulsations, no radio-femoral delay.
- Average **built.**
- No **cyanosis, pallor or jaundice.**
- No special **decubitus** (the patient is lying free flat comfortablein bed).
- **Head &neck**
  - **Corrigan sign:** strong visible carotid pulsations.
  - **Carotid thrill** (shudder) :systolic thrill.
- **U.L**
  - **Big pulse volume**
  - **Water hammer pulse:** rapid upstroke, rapid downstroke, big pulse volume
- **L.L**
  - **Pistol shot** : loud sound with each systole.

❖ **Local exam**

**A. Inspection & palpation**

- Normal shape of chest.
- No dilated veins.
- No scars of cardiac surgery.
- No pericardial bulge.
- Regarding pulsations :

❖ **Apex**: Regular apex, 75/min, lies in left 5th space MCL,localized, hyperdynamic in character, with no thrill and no rocking movement.

❖ Otherwise, apart from epigastric pulsations originating from aorta no other visible or palpable pulsations.

**B. By palpation only:**

- **Pulsations** the same as above.
- **Palpable sound** : there is no palpable 1stheart sound or diastolic shock.
- **No thrill** either on base, left parasternalarea or on apex.

**C. Percussion :**

- **Hepatic dullness** in the Rt. 5th space MCL, no dullness in the Rt. parasternal area, both aortic and pulmonary areas are resonant, preserved waist of the heart, no dullness outside the apex, lower end of the sternum is impaired note with dull bare area.

**D. Auscultation:**

- **2nd sound** normal or muffled.
- Diastolic soft blowing **murmur**, maximum intensity over the 2nd aortic area propagated to the apex, increased on setting, leaning forward and holding breath in full expiration, it's organic, grade III/VI with no thrill.

❖ NB :

- **In AR: notice you can hear systolic soft murmur localized over the 1st aortic area with no associated thrill (functional murmur of relative aortic stenosis).**
- **To be differentiated from double aortic lesion in which the murmur is propagated to the neck and the apex, associated with thrill and the patient complains of low COP symptoms.**

## ○ Discussion :

? **What is your diagnosis ?**

🕮 **Rheumatic heart disease, in the form of isolated aortic regurge, the patient is compensated and not complicated.**

? **Why Rheumatic? → from history.**

? **Why AR? → from history, exam (peripheral signs of AR, hyperdynamic apex epigastric pulsation from aorta and data of auscultation may help you).**

? **Why Compensated? → from (absence of symptoms and signs of pulmonary congestion) as no signs of LVF :apical gallop, pulsus alternans, bilateral basal crepitations.**

**→ No Complication detected**

? **What are the other causes of AR that you know?**

🕮 **Revise them from your theoretical book**

? **Is it regular or irregular palpitation?**

🕮 **Regular palpitation, because it is due to increased force of cardiac contraction.**

? **So, what does it mean if the patient with AR complains of irregular palpitation?**

🕮 **It means that his case got complicated by an arrythmia which made the palpitation become irregular.**

? **What causes angina in AR ?**

🕮 **Two types of angina occur in aortic regurge "**

- **Classic angina of effort: due to decreased diastolic blood pressure due to regurge.**
- **Angina of Lewis: nocturnal & associated with autonomic disturbances such as sweating & tachycardia.**

? **What are the other causes of systolic thrill over the carotids ?**

🕮 **See general chapter**

? **What can you hear over the mitral area in this patient ?**

1. **$S_3$.**
2. **Propagated murmur of aortic regurge.**
3. **Pan systolic murmur of functional mitral regurge.**
4. **Austin Flint murmur (mid-diastolic) due to:**

- **Elevation of anterior leaflet of the mitral valve by the regurgitant blood from the aorta causes relative MS.**

? **What are the other signs of AR that you know ( peripheral signs of AR )?**

🕮 **See before**

? **Where else can you search for capillary pulsations ?**

🕮 **See before**

? **What are the expected complications of AR ?**

🕮 **Revise them from your theoretical book**

**? What type of heart failure can occur in AR, left-sided or right-sided?**

🕮 **Left-sided heart failure due to left ventricular failure & pulmonary congestion.. However, Right-sided heart failure can also occur late secondary to left-sided heart failure.**

**? What are the Differential diagnosis of murmurs with AR?**

🕮 **Relative AS: due to increase in volume of blood pumped in systole**

🕮 **Relative MS: as regurgitant blood interferes with anterior mitral leaflet (Austin flint)**

🕮 **Relative MR: secondary to LV dilatation**

**? How would you proceed to manage this case?**

**I. Investigations**

**? What do you expect to find in the ECG of a patient with AS ?**

1. **ECG: LVE.**

**? What do you expect to find in the chest x-ray of a patient with AS ?**

2. **CXR for chamber enlargement.**

- LVE & dilated aorta (boot-shaped heart)

**? What is the most important investigation of AS ?**

3. **Echocardiography (investigation of choice, the most diagnostic, the most important ) to**
   - LVE
   - Detects the severity of valve lesion
4. **Catheterization:**

- LVE & Detects the severity of the lesion

**II. Treatment**

**D. Medical treatment**

- ○ Prophylaxis against IE & rheumatic activity.
- ○ Treatment of complications e.g. HF , AF , infections ...

**E. Surgical (valve replacement).**

**? When would you ttt this patient surgically ?**

🕮 **Indications of surgery in AR: (aortic valve replacement):**

- ○ Presence of symptoms.
- ○ Progressive cardiomegaly.
- ○ LV dysfunction.

# M.S. with T.R.

- **Personal history ….**
- **Complaint :**
- **Shortness of breath, 4 month duration**
- **History of present illness:**
- The condition started 10 years ago by gradual onset and progressive course of **dyspnea.** The patient experienced exertional dyspnea on less than ordinary effort ,on climbing the 1st floor not associated with orthopnea or PND. this dyspnea was associated with gradual onset ,progressive course rapid irregular **palpitation** increased with exertion The patient saught medical advice, Investigated by chest X-ray ,ECG and ECHO diagnosed as tight mitral stenosis and treated by mitral valve replacement
- The patient was quite well, after operation, till 4 months ago when he redeveloped again exertional **dyspnea** on less than ordinary effort associated with **orthopnea**, the patient used to sleep on three pillows and **PND**, after one or two hours of sleep the patient usually wakes up with dyspnea ,cough and wheeze then after 15 minutes the condition usually relieves . this dyspnea is associated with gradual onset, progressive course rapid irregular **palpitation** increased with exertion. Two months later, the patient experienced **dyspepsia ,dull aching pain in the right upper abdomen** associated with bilateral pitting painless **lower limb edema** extending to thigh level and also gradual onset ,progressive course of generalized **abdominal distension.**
- **Past history:**
  - There is past history of **rheumatic fever** since he was 14 years old, manifested by fever and arthritis, investigated by CBC,ESR and ECHO ,treated by aspirin and the condition relieved and he was advised to take long acting penicillin for life and it was recurrent several times
  - No DM no HTN
  - No past history of operations or drugs
- **Family history:**
  - No consanguinity , No common diseases , No similar condition
- **General exam**

**A. Overview**

- **Temperature :** 37
- **Blood pressure** 110/70
- **Pulse :** markedly irregular pulse ,75 /minute, variable volume , pulsus deficit >10,vessel wall is not felt ,equal on both sides with intact peripheral pulsations
- **Orthopnea**
- Average **built,** no **pallor** no **jaundice** ,no **cyanosis**

**B. Head & neck**

- **Congested pulsating neck veins** extending to lobule of the ear , congestion decreased by inspiration with +ve hepato-jugular reflux. There is systolic expansion with absent a wave
- No **malar flush**

**C. Extremities**

- Bilateral pitting **lower limb edema** extending to mid thigh level and not tender

- **Local exam :**

**A. Inspection and palpation**

- **Barrel shaped chest** "*just association in the case*"
- **Median sternotomy scar** of valve replacement surgery.
- **Pericordial bulge.**
- **No dilated veins.**

**Regarding pulsations :**

- **Apex:** markedly irregular apex ,90/min, lies in left 5th space outside MCL, diffuse , slappy in character ,with no thrill and no rocking movement .
- **Pulmonary pulsation** detected by palpation by tips of fingers.
- **Left parasternal pulsation** detected by palpation by base of the hand , increased by chest deflation.
- **Epigastric pulsation** detected by both inspection and palpation by tips of fingers increased by deep inspiration.
- There is **hepatic pulsation** detected by bimanual palpation of the liver

**B. By palpation only :**

- **Pulsations** the same as above
- **Palpable sound :** there is palpable 1st heart sound (slappy apex ), but no diastolic shock *"may be present in such cases, in our case may be masked by hyperinflation"*
- No **thrill** either on apex ,left parasternal area or on base

**C. Percussion :**

- **Hepatic dullness** in the Rt 5th space MCL ,there is dullness in the Rt parasternal area , Aortic area is resonant while there is **3 finger dullness in pulmonary area, obliterated waist** of the heart(*4 finger dullness in left 3rd space ,normally just 2 finger dullness*),no dullness outside the apex ,**lower end of the sternum is stony dull with dull bare area**

**D. Auscultation**

1. **Over the apex**
   - **1st sound** accentuated
   - Diastolic rumbling **murmur** ,localized over the apex ,increased on lying in the left lateral position ,it's organic ,grade III/VI with no thrill
   - **OS** may be heard !!

❖ **NB :**

- **In AF → notice the following difference: Variable 1st heart sound with no presystolic accentuation of the murmur**

2. **Over the pulmonary area**
   - **2nd sound** accentuated
   - Ejection systolic murmur of relative pulmonary stenosis (systolic, localized, soft, no thrill, grade III/IV, increased with setting ,leaning forward) .
3. **Over the tricuspid area**
   - Pan-systolic murmur of functional tricuspid regurge (systolic ,localized, soft ,no thrill, grade III/IV ,increased with inspiration "carvallo's sign")

❖ **Examination of other systems**

- In this case ,you should search for **other signs of systemic congestion** other than edema and neck veins like ascites and enlarged tender liver as a part of abdominal examination in such case

## ❖ Discussion

? **What is your Diagnosis ?**

🕮 **Rheumatic heart disease , in the form of mitral restenosis with functional tricuspid regurge ,the patient is decompensated and complicated by AF**

**Or**

🕮 **Rheumatic heart disease , in the form of mitral restenosis regurge ,the patient is decompensated and complicated by AF and functional tricuspid regurge**

? **Why Rheumatic ? → from history**

? **Why MS? → from history , exam (irregular pulse ,slappy apex, auscultation,investigation )**

? **Why TR? → from history ,general signs of systemic congestion, signs of right ventricular enlargement, auscultation and investigation )**

? **Why Decompensated? → from (symptoms and signs of systemic congestion )**

? **Why Complicated? → by AF (irregular pulse with marked irregularity and pulsus deficit >10)**

? **Investigations:**

- **ECG for chamber enlargement and arrhythmia**
- **CXR for chamber enlargement (plain and contrast)**
- **ECHO(investigation of choice ): for anatomical functional aetiological diagnosis and for detection of complication**

? **Treatment:**

- **Medical (prophylactic and symptomatic )**
- **Surgical (mitral valve replacement *"2nd time for our case"* )**

# Double Mitral Lesion

## Personal history: ....

## Complaint :

- **Palpitation of 10 days duration.**

## History of present illness:

- The condition started 3 years duration by rapid **regular palpitation**. The palpitation increased by exertion & stress. It is relieved by rest. 2 years ago, the patient experienced **exertional dyspnea** on less than ordinary effort, on climbing the 1st floor not associated with orthopnea or PND.
- The patient remained symptom-free then he developed **rapid irregular palpitation** increased by exercise & relieved by rest .He experienced orthopnea & PND .He gave a history of symptoms of systemic congestion as **LL eodema** 6 months ago of progressive course associated with **dull aching pain in RT hypochondirum** increasing with exertion relieving by rest.
- No symptoms of low COP.
- No history neither of chest pain nor of pressure symptoms.

## Past history:

- There is past history of **rheumatic fever** Since he was 15 years old, manifested by fever and carditis , investigated by CBC, ESR and ECHO, treated by some medications -not known by the patient- and the condition relieved and he was advised to take long acting penicillin for life and it was recurrent several times.
- No DM no HPN.
- Past history of tonsillectomy at the age of 15 years
- No history of drug allergy

## Family history

- +ve consanguinity.
- No common diseases in the family, No similar condition in the family.

## General exam

- **Temperature:** 37°
- **Blood pressure:** 110/70.
- **Pulse:** irregular pulse, 75/minute, equal volume on both side, pulsus deficit>10, vessel wall is not felt, equal on both sides with intact peripheral pulsation with radio-femoral delay.
- **RR :** 22 \ min
- **Mentality:** The patient is fully conscious oriented to time, place & persons. He in of average mood & affect & of good memory & average intelligence. He is co-operative.
- Average **built.**
- No **cyanosis, pallor or jaundice.**
- The patient is **orthopneic.**
- Bilateral pitting L.L **edema** up to mid leg.
- No **clubbing.**
- **Neck veins:** congested pulsating neck veins, Systolic expansion& absent a wave.

## Systemic overview

  - **Chest:** fine bilateral basal crepitations.
  - **Liver:** enlarged tender with systolic expansion.

## Local exam:

### 1. Inspection and palpation

- Normal shape of chest.
- No dilated veins on chest wall.
- No pericordial bulge.
- Regarding pulsations :
- **Apex:** Irregular apex, 90/min, lies in left 6th space outside MCL, diffuse, hyperdynamic in character, with systolic thrill in left lateral position.
- Weak **epigastric pulsations** originating from above & from RT side ( of hepatic origin),
- RT & Lt **parasternal** pulsations.
- No other visible or palpable pulsations.

2. **Percussion :**

- o **Hepatic dullness** in the Right 5th space MCL, dullness in the right parasternal area & lower third of sternum, increased dullness over bare area, both aortic and pulmonary areas are resonant, preserved waist of the heart, no dullness outside the apex.

3. **Auscultation**

   A. **Over the apex:**
   - o **Variable S1**
   - o **S3 sound !!**
   - o **Pansystolic soft murmur heard maximally over the apex, propagated laterally to the axilla & upwards to the base of the heart , heard best in the left lateral position & with exercise.**

   B. **Over tricuspid area: Pansystolic soft murmur which increases by inspiration**

## ❖ Discussion :

? **What is your diagnosis?**

🕮 **Rheumatic heart disease, Mitral valve disease, double mitral, TR with biventricular enlargement. non Compensated ,Complicated by AF.**

➢ **Why Rheumatic? → from history & presence of multi valve lesions**

➢ **Why double mitral? →**

| 1. Because there is clinical evidence of MR in the form of: | 2. Because there is clinical evidence of MS in the form of: |
|---|---|
| ❖ From history | |
| o Palpitation | o Dyspnea with PND. |
| ❖ From precordial examination | |
| o Signs of LV enlargement : Hyperdynamic apex , Localized apex with overlying systolic thrill | o Signs of RV enlargement: left parasternal uplift, epigastric pulsations, dullness over lower sternum. |
| ❖ From auscultation | |
| ↳ S3 sound ( protodiastolic ) due to volume overload.<br>↳ Typical murmur of MR:<br>o Timing: pansystolic.<br>o Character: soft or harsh.<br>o Site: over the apex.<br>o Propagation: *laterally to the axilla* ( usually ), *upwards to the base of the heart* ( uncommonly).<br>o Position: heard best in the left lateral position. | ↳ Normal S1 over the apex (instead of muffled S1) : indirect evidence of the presence of MS.<br>↳ Typical murmur of MS: was not clear.<br>↳ Evidence of PH: accentuated S2 over the pulmonary area. |

? **Why TR ?**

🕮 **From history: Symptoms or RVE ( LL edema , RT hypochondrial pain**

🕮 **Examination:**

- o **General : congested pulsating neck veins with systolic expansion & tender pulsating liver**
- o **Local : Sings of RV enlargement**
  - **By inspection & palpation: Rt parasternal pulsations,epigastric pulsations ,diffuse apex**
  - **By auscultation: pansystolic soft murmur on tricuspid area increased by inspiration.**

? **Why Non-Compensated? → from (presence of symptoms and signs of LVF & RVF ).**

? **What is the evidence of LVF ? S3 , fine basal crepitation & orthopnea.**

? **What is the main presenting symptom of MR? Palpitation**

? **Is it regular or irregular palpitation of MR? Regular because it is due to increased force of cardiac contraction**

? **When does the patient say it is irregular palpitation?** If complicated by an arrythmia:AF, which made the palpitation become irregular

? **What proves that the patient developed AF as a complication?**

🕮 From History

○ Palpitation changed from regular to irregular.

🕮 From General Examination

○ Systolic expansion in neck veins & absent a wave.

○ Marked irregularity in pulse rhythm, with pulsus deficit more than 10.

🕮 From auscultation: Variable first heart sound

? **But, I can hear a mid diastolic rumbling murmur over the apex that you did not mention, what does it indicate?**

🕮 It indicates the presence of a relative mitral stenosis (not organic) due to increased blood flow across the mitral valve in cases of MR.

? **How would you confirm the diagnosis of AF by one single investigation?**

🕮 ECG will reveal: 1) Irregular rhythm. + 2) Absent p wave.

? **Why is S1 muffled in the patient with MR?**

🕮 Due to failure of proper mitral closure.

? **When can you hear a normal or an accentuated S1 in cases of MR?**

🕮 In cases of MR associated with Mitral Stenosis , i.e. Double Mitral lesion.

? **Why is S1 accentuated in the patient with MS?**

- Fibrosis of the mitral cusps.
- Forcible closure of the mitral cusps: because:
  - They are displaced downwards due to high LA pressure.
  - The mitral valve is opened as wide as possible during the diastole.

? **In which condition does the murmur of MR propagate upwards to the base of the heart?**

🕮 In cases where MR is due to disease of the posterior leaflet.

? **Can the murmur of MR propagate medially to the tricuspid area?**

🕮 Sometimes, yes, also in disease of the posterior leaflet.

? **On the tricuspid area, how would you differentiate clinically between the pansystolic murmur of propagated MR & the pansystolic murmur of TR?**

| ❖ MR | ❖ TR |
|---|---|
| ○ Pansystolic murmur on apex radiating to axilla | ○ Pansystolic murmur on tricuspid radiating to apex |
| ○ Inspiration has no effect on murmur | ○ Inspiration increase the murmur (caravallo's sign). |
| ○ Associated with ↓ S1, S3 & LVH | ○ RVH and pulsating liver & congested neck veins |

? **How would you proceed to manage this case?**

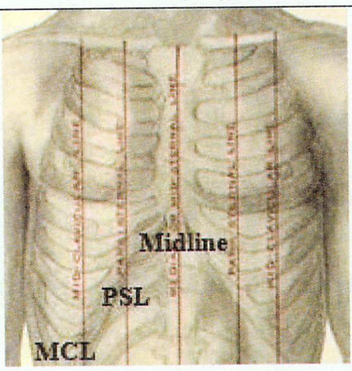
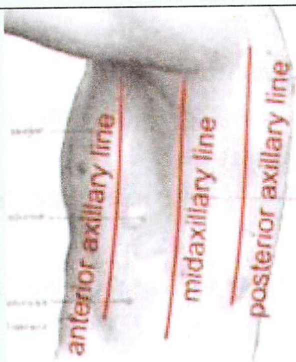
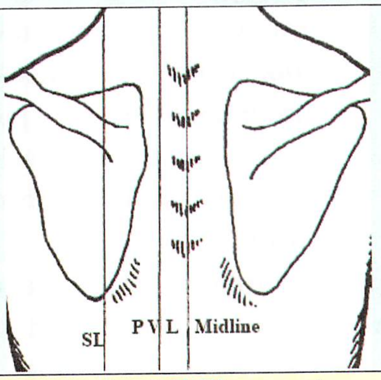
- I would ask for *echocardiography* to prove my diagnosis of Double mitral lesion.
- I would then start treatment which could be: medical or surgical

? **What kind of surgery would you do for this patient with double mitral valve ?**

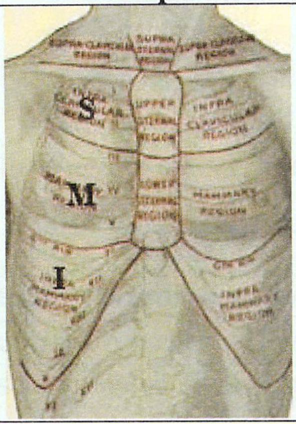
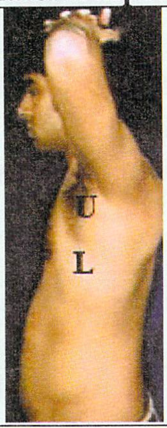
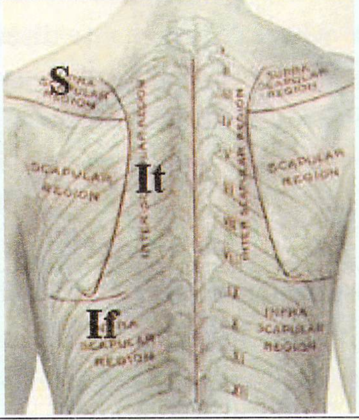
- Valve replacement.

# CHEST

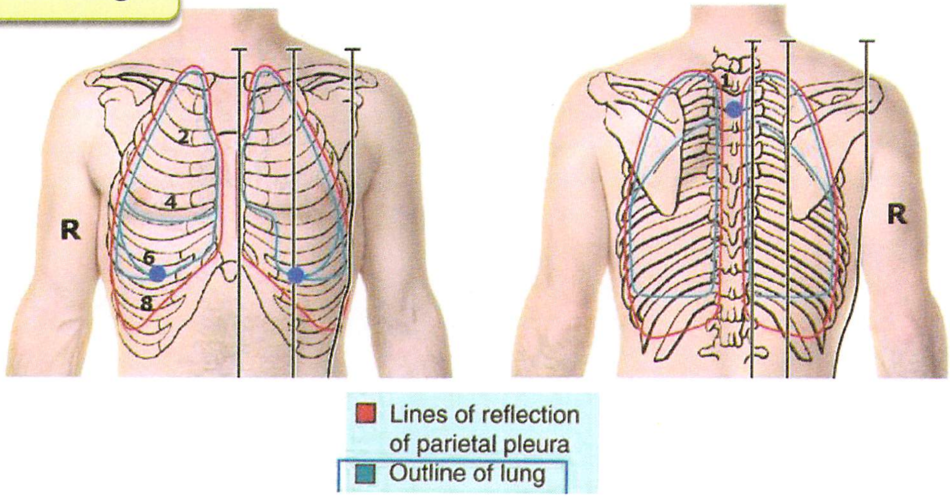
## ❖ Lines of the chest :

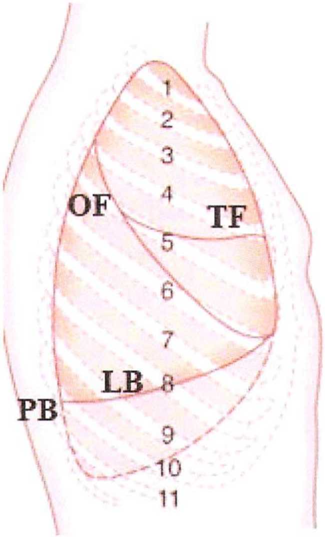
| ❖ Front | ❖ Lateral | ❖ Back |
|---|---|---|
|  Midline<br>PSL<br>MCL |  anterior axillary line<br>midaxillary line<br>posterior axillary line |  SL<br>PVL<br>Midline |
| ▪ **Anterior Midline :** middle of the sternum | ▪ **Anterior axillary line (AAL):** anterior fold of axilla | ▪ **Posterior Midline :** spines of vertebrae |
| ▪ **Parasternal line (PSL):** midway between MCL & lateral border of the sternum | ▪ **Mid axillary line (MAL):** apex of axilla | ▪ **Paravertebral line (PVL):** midway between midline & medial aspect of scapula |
| ▪ **Midclavicular line (MCL) :** midway between acromion process and sternoclvicular joint | ▪ **Posterior axillary line (PAL):** posterior fold of axilla | ▪ **Scapular line (SL) :** from the angle of scapula |

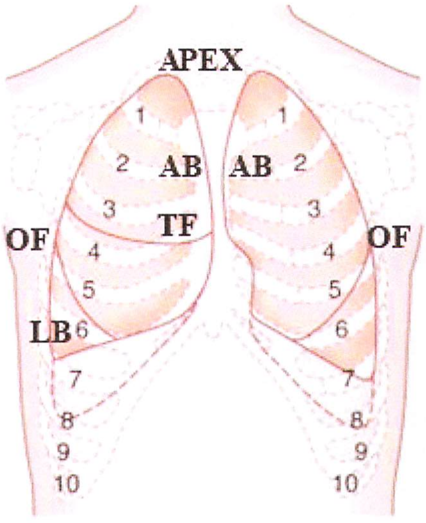
## ❖ Regions of the chest :

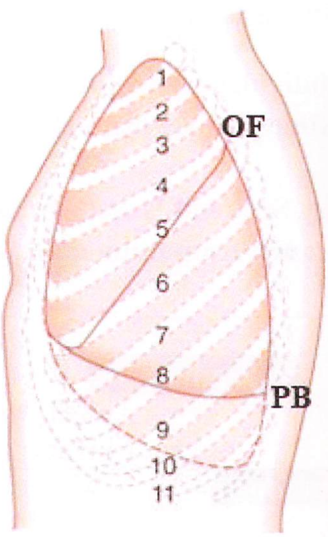
| ❖ The chest has right & left side, each side has: | | |
|---|---|---|
| 1) Anterior aspect | 2) Lateral aspect | 3) Posterior aspect |
|  |  |  |
| ○ Supra-mammary area | ○ Upper axillary area | ○ Supra-scapular area |
| ○ Mammary area | | ○ Inter-scapular area |
| ○ Infra-mammary area | ○ Lower axillary area | ○ Infra-scapular area |

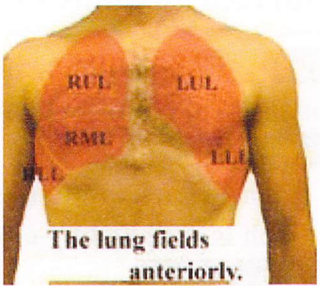
## ❖ Surface anatomy of the lung:


2
4
6
8
R
1
R
🟥 Lines of reflection of parietal pleura
🟦 Outline of lung

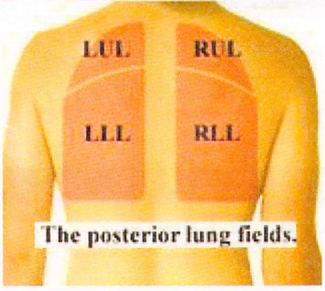

1
2
3
4
OF
TF
5
6
7
LB
8
PB
9
10
11


APEX
1
1
2
AB
AB
2
3
TF
3
OF
4
4
OF
5
5
LB
6
6
7
7
8
8
9
9
10
10


1
2
3
OF
4
5
6
7
8
PB
9
10
11


RUL
LUL
RML
LLL
RLL

The lung fields anteriorly.


LUL
RUL
LLL
RLL

The posterior lung fields.

## 1. Apex of lung :

- Curved line rising 2- 4 cm above inner 1/3 of clavicle, passing downwards to sternoclavicular joint

## 2. Anterior border:

- From sternoclavicular joint, line passes downwards & medial to reach middle line at angle of Lewis
- It then descends in midline :

| | |
|---|---|
| A. In right lung, it reaches level of 6th costochondral cartilage | B. In left lung, it reaches level of 4th costal cartilage & then deviates for 1 inch to left of sternum (bare are of heart – cardiac notch), then it curves down & medially to end at 6th costochondral cartilage |

## 3. Lower border of lung & pleura:

| | MCL | MAL | Scapular line |
|---|---|---|---|
| Upper border of Liver (right side) | 5th space | 7th space | 9th space |
| Lower border of Lung | 6th rib | 8th rib | 10th rib |
| Lower border of Pleura | 8th rib | 10th rib | 12th rib |

## 4. Posterior border:

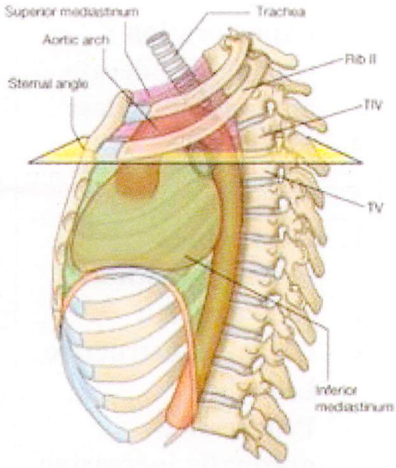
- Runs vertically upwards along sides of vertebral column starting from level of T10 spine below, ending at apex above.

## 5. Oblique fissure in both lungs :

- Line passing down & outwards oblique line from T2 spine, to the 5th rib in mid-axillary line, then to the 6th costochondral cartilage.

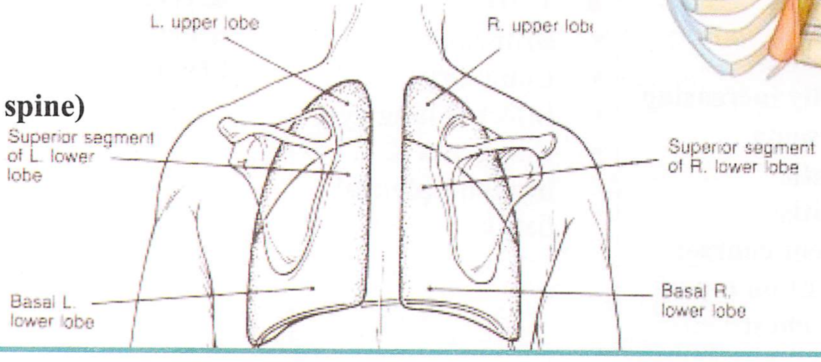
## 6. Transverse fissure of right lung:

- From the 4th costochondral cartilage to meet the line of oblique fissure in MAL
- It divides the upper right lobe into right upper and middle lobes.


Superior mediastinum
Trachea
Aortic arch
Rib II
Sternal angle
TIV
TV
Inferior mediastinum

## 7. Bifurcation of trachea :

- Anteriorly at the level of sternal angle,
- Posteriorly at the body of T4 (tip of T2 spine)


L. upper lobe
R. upper lobe
Superior segment of L. lower lobe
Superior segment of R. lower lobe
Basal L. lower lobe
Basal R. lower lobe

☠ When you examine back, you examine lower lobe mainly

→ When you examine *interscapular region*, you examine *apical segments of lower lobes*

☠ When you examine the front, you examine upper lobe in the left lung and upper and middle lobes in right lung

☠ When you want to examine middle lobe only,

→ you examine the area between 4th to 6th ribs at MCL line on the right side

- سؤال مشهور جدا : افحص يا دكتور ال middle lobe of the lung

## ❖ Surface anatomy of the Bronchopulmonary Segments:

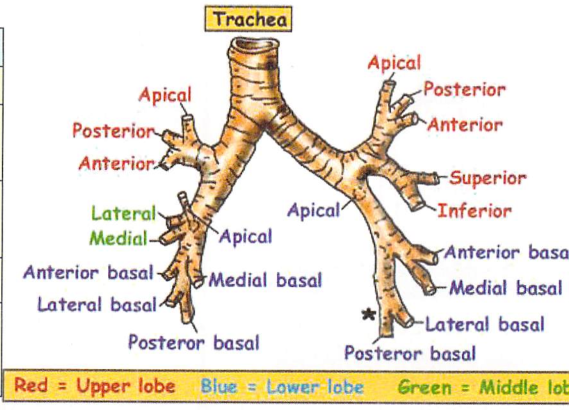
**A. Definition :** each lung is subdivided into a functionally independant segments each is supplied by a tertiary bronchus called bronchopulmonary segment (BPS)

**B. Shape & structure :**

- ○ Each Bronchopulmonary Segment is wedge shape, having an apex at hilum & a base at surface of lung
- ○ Each is supplied by a branch from pulmonary artery & pulmonary vein

**C. Pattern of BPS :**

| A. Right lung | B. Left lung |
|---|---|
| **❖ Upper lobe:** | |
| ▪ Apical, Anterior, Posterior | ▪ Apical, Anterior, Posterior<br>▪ Lingular: Superior , Inferior |
| **❖ Middle lobe only in the right lung :**<br>▪ Medial & Lateral | |
| **❖ Lower lobe:** | |
| ▪ Apical<br>▪ Anterior basal, Posterior basal, Medial basal, Lateral basal | |


Trachea
Apical
Posterior
Anterior
Lateral
Medial
Apical
Anterior basal
Medial basal
Lateral basal
Posteror basal
Apical
Posterior
Anterior
Superior
Inferior
Apical
Anterior basa
Medial basal
*
Lateral basal
Posteror basal
Red = Upper lobe
Blue = Lower lobe
Green = Middle lob

## CHEST CASES

| ❖ Case | | | |
|---|---|---|---|
| A. COPD = COLD = COAD | B. Suppurative lung syndrome = cavitary syndrome | C. Pleural effusion | D. Pulmonary fibrosis |
| ❖ Patient complains: | | | |
| 1. Exertional dyspnea : gradual and progressive<br>2. Cough<br>3. Expectoration : whitish , moderate amount, odourless<br>4. ± Wheezes<br>❖ Due to:<br>1. Reversible : Bronchial asthma<br>2. Irreversible :<br>• Chronic obstructive bronchitis:<br>○ Progressive gradually increasing<br>• Emphysema<br>• Asthmatic bronchitis:<br>○ Remittent course; recurrent on top of wheezy chest | 1. Cough & expectoration :<br>☠ Big amount<br>☠ Bad odour "foetid"<br>☠ Purulent "yellowish or greenish "<br>☠ Postural<br>2. Dyspnea<br>3. ± wheezes<br>4. ± hemoptysis<br>❖ N.B.:<br>💣 4 DD :<br>▪ Bronchiectasis<br>▪ Lung abscess<br>▪ Infected lung cyst<br>▪ Empyema & broncho-pleural fistula | 1. Pleuritic pain, character :<br>○ Stitching<br>○ Superficial<br>○ Localized may be referred<br>○ Decrease by shallow breathing & lying on diseased side<br>○ Increased by deep breathing , cough or sneezing<br>2. Dry cough<br>3. Dyspnea : acute & at rest<br>4. History of pleural effusion & recurrent aspiration which may lead to *pleural* FIBROSIS (fibrothorax) | 1. dyspnea : exertional , gradually , progressive<br>2. DRY cough<br>3. Dull aching Chest pain<br>❖ N.B.:<br>✌ Types of pulmonary fibrosis:<br>A. Parenchymatous fibrosis:<br>• Occurs as a complication of various lung diseases e.g.<br>○ TB (most of cases)<br>○ Lung abscess<br>○ Bronchiectasis<br>B. Interstitial fibrosis: idiopathic pulmonary fibrosis (Hamman Rich syndrome) |

↳ **N.B.:**

A. Definition of Chronic bronchitis: productive cough every day or most of days + duration ≥ 3months/year for 2 successive years

B. Asthmatic bronchitis: = BA + Chronic bronchitis

C. TB can cause :

- ○ TB cavity {SLS (Lung abscess) + TB} → may cause fibrosis
- ○ Bronchiectasis → may cause fibrosis
- ○ Pleural effusion → may cause fibrosis
- ○ Parenchymatous fibrosis

# CHEST HISTORY

## 1) Personal History

| | | |
|---|---|---|
| 1. Name: الإسم ثلاثي | 2. Age:<br>○ Young : TB, adenoma<br>○ Old : bronchial carcinoma | 3. Sex :<br>○ Females : adenoma<br>○ Males : Carcinoma |
| 4. Occupation:<br>○ Dusty work: emphysema, pneumoconiosis<br>○ Farmers: bronchial asthma, bilharzial cor pulmonale<br>○ Asbestosis : mesothelioma | 5. Marriage: for TB transmission to the whole family members , ask about fertility because infertility associated with Kartagner's syndrome<br>6. Menstrual history if female. | 7. Residence & address: chronic bronchitis is more common in areas of high pollution |
| 8. Habits of medical importance:<br>1. Cigarette smoking : bronchial carcinoma, chronic bronchitis & COPD<br>2. Goza : transmission of infection, COPD<br>3. IV addicts : fungal & staph acute bacterial endocarditis | | 9. Handedness. |

## 2) Complaint + duration: إي اللي جابك المستشفى ؟

❖ Common complaints :

| | | | | |
|---|---|---|---|---|
| ▪ Shortness of breath. | ▪ Cough | ▪ Excessive spitting | ▪ Coughing of blood | ▪ Chest pain |

## 3) History of present illness = HPI المرض بدأ معاك إزاي , آخر مرة كنت كويس فيها إمتى ؟

| | |
|---|---|
| 1. Symptoms of CHEST:<br>▪ C: Cough<br>▪ H: Hemoptysis<br>▪ E: Expectoration<br>▪ S: Shortness Of Breath<br>▪ T: Wheezes (Tazee2 تزييق ) | 2. Symptoms of systemic Congestion: Cor-pulmonale<br>▪ Cor-pulmonale: right ventricular enlargement ± failure secondary to chest disease<br>3. Cyanosis : Suggestive Symptoms of respiratory failure<br>4. Constitutional (toxic) symptoms |
| 5. Pleural effusion aspiration<br>6. Chest Pain<br>7. Pressure symptom | |
| 8. Investigations & treatment received | 9. Symptoms of other systems |

| | |
|---|---|
| | تتكتب في ال complaint بكلام العيان |
| | تتكتب في H/O of present illness عادي |

## 1. Symptoms of CHEST

### 1) Cough :

- Cough

| | |
|---|---|
| **A. OCD, ↑, ↓ (ATP)**<br>في كحه ؟ ظهرت فجأة ولا ازاي ؟ ايه اللي بيزودها وايه اللي بيقللها ؟ | **B. Associated symptoms** ؟ الكحة كانت معاها أعراض تانية؟<br>○ Dyspnea & wheezes in COPD<br>○ Toxemia in Suppurative Lung Syndrome (SLS) |
| **C. Time :** بتزيد في وقت معين ؟ بتزيد بليل ولا الصبح ولا ثابتة ؟<br>○ 1 – 2 hours after sleep i.e. nocturnal (cardiac asthma)<br>○ Early in the morning (Bronchiectasis & Bronchial Asthma; BA) | **D. Type :**<br>هل الكحة ديه مستمرة طول الوقت ولا في صورة نوبات بتيجي وتروح ؟<br>○ Continuous<br>○ Paroxysmal (BA, SLS) |
| **E. Relation to Position (SLS)** ؟ هل فيه وضع معين بيزود الكحة | |

؟ هل الكحة ببلغم ولا ناشفة

**F. Dry** ناشفة **or Productive** ببلغم;

**If productive** ببلغم **= Expectoration; analyze (APCD +SO) :**

- Excessive spitting

- **Amount:** ؟ كمية البلغم اد اي في اليوم = Cup = 200 cc /day
  - SLS : big, thick
  - COPD: moderate amount
  - BA: small amount, viscid pellets
- **Associated symptoms** ؟ هل كان معاه أعراض تانيه e.g. wheezes (COPD), toxemia (SLS)
- **Postural variation is characteristic to SLS:** ؟ هل البلغم ده بيزيد في وضع معين
  - Lung abscess: ↑ by lying on healthy side
    - لو البلغم بيزيد لما ينام على جنب معين يبقى عنده abscess في الجنب التاني ,
    - على سبيل المثال : لو بيزيد لما ينام على جنبه الشمال يبقى عنده abscess في الجنب اليمين
  - Bronchiectasis : ↑ by stooping (leaning) forward
    - لو البلغم بيزيد معاه لما يميل لقدام ... يبقى أهلاً بال Bronchiectasis
- **Color & Consistency (Character):** ؟ لون البلغم ايه ؟ أبيض ولا ليه لون

| | Color | Consistency (Character) |
|---|---|---|
| COPD | Whitish | Mucoid |
| COPD with secondary infection | ○ Greenish (anaerobic infection)<br>○ Yellowish (pyogenic infection) | Muco-purulent |
| SLS | Yellowish | Purulent |

- **Diurnal variation (time):** البلغم ده بيزيد في النهار ولا بليل؟
  - Nocturnal: cardiac
  - Early in the morning : chest : Bronchiectasis & Bronchial Asthma (BA)
- **Seasonal Variation :** ؟ هل البلغم ده بيزيد في موسم معين عن التاني ؟ صيف ولا شتا
  - Allergy (pollen in spring) : allergic rhinitis & Bronchial asthma
  - Bronchiectasis : more in winter
- **Odor :** ؟ هل البلغم له رائحة
  - Odourless
  - Offensive = foetid = foul sputum in SLS or infection by anaerobes

### 2) Hemoptysis : in TB & SLS especially bronchiectasis

- Coughing of blood = blood spitting

- بتكح دم ؟ من إمته ؟ وظهرت بالتدريج ولا فجأة ؟ كام مرة كحيت دم ؟
- الكمية أد ايه ؟ لونه ايه ؟ الدم اللي كحيته كان دم بس ولا كان دم ومعاه حاجه ؟
- هل فقدت الوعي ؟ هل نزفت من حته تانيه ؟ هل احتجت ينقلوك للمستشفى ؟ احتجت ينقلوك دم ؟

- OCD, ↑, ↓, then analysis **(ABCD)** :

**A. Attack :** number, date, before the attack…, during the attack…, after the attack …,

**B. Blood :** amount, content, color

| | ❖ Hemoptysis | ❖ Hematemesis |
|---|---|---|
| ▪ Before attack: | Cough | Nausea, vomiting |
| ▪ During attack: | | |
| ○ Symptoms | Coughing blood | Vomiting blood |
| ○ Colour | Bright red blood | Dark; Coffee-ground (hematine) لون البن المحروق |
| ○ Content | Mixed with air (frothy) | Mixed with food |
| ○ Chemical reaction (pH) | Alkaline | Acidic |
| ▪ After attack | Blood tinged sputum for a while | Melena and constipation |
| ▪ Examination | Chest , CVS signs | GIT signs |

C. **Circulatory compensation** : hospital admission, blood transfusion

D. **Dysfunction** : Disturbed conscious level, bleeding from other orifices

✍ … years ago, the patient had {number of attacks….} of hemoptysis of acute onset , {…} course, the attack was in {Date e.g. The fourth of April, nineteen ninety three. (Apr. 1993)} …was preceded few days before by cough & expectoration of {Amount e.g. small or moderate or large amount} of {blood tinged sputum in bronchiectasis or frank blood in bronchiectasis sicca haemorrhagica} bright red in colour, containing froth then followed by blood tinged sputum for a … days, {±} associated with loss of consciousness, the patient sought medical advice, he was admitted to … hospital, investigated by …, received treatment in the form of ….

**3) Dyspnea:**؟هل عندك كرشة نفس , نهجان

✍ Shortness of breath, for analysis : see cardiology

4) **Wheezes; (Tazee2 تزييق ):** عندك تزييق في صدرك ؟

- **Definition:** musical sound produced by passage of air through narrow bronchi; type :
  - ☞ **If the patient in-between attacks:**
  - ○ Still have wheezes i.e. Continuous i.e. irreversible : asthmatic bronchitis
  - ○ Free i.e. Paroxysmal i.e. reversible : BA; ask about time of attack, ↑,↓

| | |
|---|---|
| **2. Symptoms of systemic Congestion indicating right side heart failure (cor-pulomonale)**<br>رجلك أو بطنك نفخت ؟ في وجع في جنبك اليمين ؟ عينك اصفرت ؟ | **3. Cyanosis**<br>ازرقيت ؟ شفايفك بتزرق ؟ ضوافرك بتزرق ؟ |
| ○ Lower limb edema (LL swelling)<br>○ Ascites (abdominal distension)<br>○ Hepatic congestion:<br>▪ Jaundice<br>▪ Pain in Right Hypochondrium<br>○ GIT congestion:(nausea , vomiting, etc… )<br>☞ For analysis of each one; see cardiology. | ○ OCD, ↑, ↓, Relation to position or exertion.<br>○ Cyanosis is a suggestive symptom of respiratory failure; respiratory failure is a laboratory diagnosis ; ABG.<br>○ ± Interstitial pulmonary fibrosis |
| **4. Constitutional (toxic) symptoms** | **5. Pleural effusion aspiration, Analysis:**<br>هل عملت بزل او تشفيط ؟ |
| عندك فقدان للشهية ؟ وزنك خَس ؟ بتعرق كتير؟<br>○ Night fever , night sweats, loss of weight & loss of appetite<br>○ Suggestive of malignancy, TB toxemia & SLS e.g. lung abscess | ○ Amount : if 1 bottle ( 500 cc) طلعوا كام زجاجة جلوكوز؟<br>○ Aspect : clear or turbid ؟ كان صافي ولا معكر<br>○ Colour ؟ كان لونه اي<br>○ Complicated or not (e.g. infection, fistula)<br>هل حصلك اي مشاكل زي التهابات او فتحة على الجلد مرضتش تقفل ؟<br>○ Recurred or not ؟ هل خفيت ولا الموضوع اتكرر معاك تاني |
| **6. Pressure symptoms for mediastinal syndrome**<br>هل صوتك اتنبح ؟ هل عندك صعوبة في البلع؟ | **7. Chest Pain**<br>هل عندك ألم في صدرك ؟ |
| ▪ For analysis; see cardiology | ▪ For analysis; see cardiology. |
| **8. Investigation & treatment:**<br>عملت فحوصات اي ؟ واخدت علاج اي؟ | **9. Other systems** |
| ☞ Chest investigations as :<br>○ Sputum examination, Culture & sensitivity of expectorated sputum<br>○ Tuberculin skin test, Chest X-ray, CT chest<br>○ Arterial blood gases (ABG)<br>☞ Treatment received as :<br>○ Bronchodilators, Steroids, Antibiotics, Aminophylline<br>○ Nebulization & Domestic o2 therapy | ○ Symptoms of other systems e.g. CVS, GIT, neurology<br>هل عندك مشاكل تانية في جسمك ؟<br>وتاخد كل سيستم وتسأل العيان على الأعراض الكبيرة اللي فيه بسرعة أوي |

## 4) Past history as usual but focus on tuberculosis:

جالك زمان كحة ودم وبلغم ؟ كنت بتسخن بليل وتبل الملايه عرق ؟ اتحجزت في مستشفى الصدر وأخدت علاج لفترة طويلة ؟

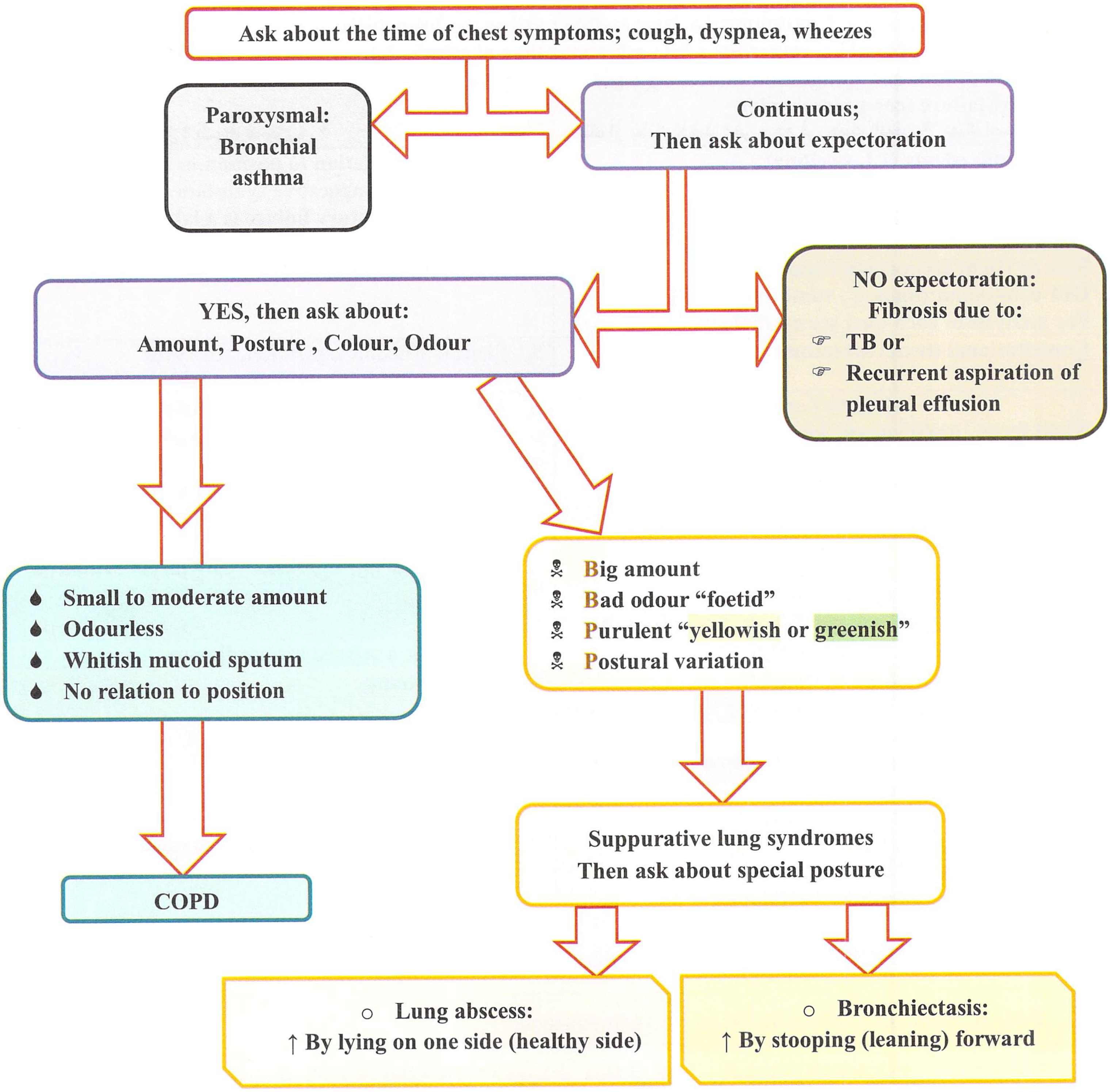
- **Constitutional (Toxic) symptoms** e.g. Night fever , night sweats, loss of weight & loss of appetite
- **Chest symptoms** e.g. cough, expectoration , dyspnea, hemoptysis
- Admission to chest sanatorium, Antituberculous drugs intake
- Multiple drugs for a long period (minimum 6 months)
- Repeated daily intramuscular injection with streptomycin or oral intake of rifampicin with red discoloration of urine

- Start the history of the patient by TB at the beginning of HPI
- Don't forget to ask about DM in the past history , if positive analyze and start HPI with the patient is known to diabetic

- لابد أن تذكر ال DM سواء كان +ve أو –ve لأن TB follows DM like its shadow!

**5) Family history as usual & asked for allergy, Bronchial Asthma , TB**

## Algorithm of Chest History For Diagnosis



Ask about the time of chest symptoms; cough, dyspnea, wheezes

Paroxysmal:
Bronchial asthma

Continuous;
Then ask about expectoration

YES, then ask about:
Amount, Posture , Colour, Odour

NO expectoration:
Fibrosis due to:
☞ TB or
☞ Recurrent aspiration of pleural effusion

- Small to moderate amount
- Odourless
- Whitish mucoid sputum
- No relation to position

COPD

☠ **B**ig amount
☠ **B**ad odour "foetid"
☠ **P**urulent "yellowish or greenish"
☠ **P**ostural variation

Suppurative lung syndromes
Then ask about special posture

○ Lung abscess:
↑ By lying on one side (healthy side)

○ Bronchiectasis:
↑ By stooping (leaning) forward

# General Examination Of Chest Case

❖ **Examination as general examination but stress on the following:**

## I. Vital signs

| ❖ Temperature | ❖ Blood pressure | ❖ Respiratory Movements |
|---|---|---|
| ▪ **High grade fever :** pneumonia, lung abscess<br>▪ **Low grade fever :** TB, bronchial carcinoma | ▪ **Hypertension :** polyarteritis nodosa causing bronchial asthma<br>▪ **Hypotension :**<br>○ Right side heart failure in cor-pulmonale,<br>○ Miliary TB causing Addison's disease | ▪ See details later in the chapter. |

❖ **Pulse:** مهم جداً جداً جداً

- **Rate:**
  - ○ **Tachycardia:** due to hypoxia & respiratory distress & B stimulants in treatment of BA
  - ○ **Bradycardia:** sarcoidosis infiltrating AV bundle
- **Rhythm :**
  - ○ **Irregular :** multifocal atrial tachycardia (MAT) in chronic hypoxia (e.g. COPD) or atrial fibrillation (AF)
- **Volume :**
  - ○ **Big pulse volume :** VD due to hypoxia
  - ○ **Small pulse volume:** ↓ COP due to cor-pulmonale (P.HTN & RV failure)
- **Special Character:**
  - ○ **Water hammer pulse :** emphysema (VD caused by hypoxia)
  - ○ **Pulsus paradoxus** in severe COPD or status asthmaticus
- **Unequal pulse volume :** thoracic inlet syndrome

## II. General overview

| A. Appearance | B. Built | C. Consciousness | C. Colors | D. Decubitus | E. Expression |
|---|---|---|---|---|---|
| ▪ Toxic in TB, suppurative lung syndrome<br>▪ Cachectic if malignancy | ▪ **Underbuilt :** TB since childhood<br>▪ **Overbuilt:** Pickwickian syndrome with corpulmonale | ▪ Cloudy consciousness in respiratory failure | ▪ See below | ▪ **Orthopnea :** in severe emphysema, ascites in cor-pulmonale<br>▪ **lateral decubitus :** lung abscess (on healthy side) & pleurisy (on diseased side) | ▪ Moon face due to steroids therapy for bronchial asthma |

**What are the Causes of … in chest case ?**

| ❖ Jaundice | ❖ Cyanosis | ❖ Pallor |
|---|---|---|
| 1. **Hepatocellular:**<br>▪ Cor pulmonale : liver congestion<br>▪ Rifampicin (anti TB)<br>▪ Associated viral hepatitis<br>2. **Hemolytic:** pulmonary embolism<br>3. **Obstructive:** bronchial carcinoma (liver metastases) | ○ **Peripheral:**<br>▪ Right sided Heart Failure (Bilharzial corpulmonale)<br>▪ SVC thrombosis<br>○ **Central:**<br>▪ COPD (hypoxic cor pulmonale)<br>▪ Pulmonary fibrosis,<br>▪ Pulmonary embolism,<br>▪ Acute pulmonary failure.<br>○ **Both central & peripheral:**<br>▪ Massive pulmonary embolism | ▪ Infection<br>▪ Lung abscess<br>▪ Bronchiectasis<br>▪ Pneumonia<br>▪ Pulmonary embolism<br>▪ TB<br>▪ Malignancy |

## III. Systemic overview :

### ❖ Head

1) Eyes:
- Argyl Robertson pupil in syphilis with pulmonary hypertension
- Puffy lids : chronic cough, cor pulmonale
- Blue sclera : pulmonary TB
- Fundus : Choroidal nodules in miliary TB, papilledema in hypercapnea
- Phlyctenular conjunctivitis in TB
- SubConjunctival hemorrhage in chronic cough
- Horner's syndrome : Pancoast tumor, mediastinal syndrome

2) Nose & Cheeks:
- Working Ala nasi : severe dyspnea in pneumonia
- Plethoric face : polythycemia in COPD

3) Mouth& Throat:
- Mouth odour : fetid odour in SLS
- Tongue : central cyanosis

### ❖ Neck

- Enlarged cervical LN especially scalene LN : TB, sarcoidosis, bronchial carcinoma.
- Congested neck veins :
  - Pulsating :
    - RVF (cor pulmonale)
    - ↑ Intrathoracic pressure in : pneumothorax , emphysema
  - Non pulsating :
    - Mediastinal syndrome (SVC obstruction)
    - Severe RVF (cor pulmonale)

### ❖ Upper limb

- Tremors :

A. Fine tremors : B stimulant used in treatment of bronchial asthma
B. Flapping tremors (asterixis) : respiratory failure

- Clubbing :

a) Hypoxic:
- COPD; clubbing usually mild – marked in associated bronchiectasis
- Interstitial pulmonary fibrosis

b) Toxic:
- Suppurative lung syndromes
- Fibroid type of pulmonary TB
- Bronchogenic carcinoma
- Pleural methothelioma

c) Unilateral : Pancoast tumor

### ❖ LL

- Chest Causes of LL oedema:

1. RVF: due to corpulmonale
2. Hypoalbuminemia:
   - Lost purulent sputum in SLS
   - Frequent aspiration of empyema
   - Nutritional : anorexia (↓ protein intake)
3. Nephrotic syndrome : renal amyloidosis in long standing SLS
4. Acid-base disturbance: Renal regulation in COPD : ↑PC02 leads to compensatory ↑ NaHC03 reabsorption from kidney, with Na & H20 retention
5. Cortisone therapy for BA

## IV. Other systems except that of local exam :

### ❖ Cardiac examination

A. As a cause :
- Pulmonary congestion
- Pleural effusion
- Left side heart failure, fine bilateral basal crepitation

B. As a result : cor-pulmonale

C. As an association : Kartagener syndrome

### ❖ Abdominal examination

A. Hepatomegaly : may occur due to
- Cor pulmonale : Bilharzial , hypoxic
- Amebic liver abscess
- Amyloidosis : chronic toxemia
- Secondaries from bronchial carcinoma
- Fatty changes : chronic toxemia
- Associated liver disease : viral hepatitis
- Ptosed liver (downward displacement) in emphysema (palpable liver)

B. Ascites : corpulmonale "Bilharzial, hypoxic"

C. Splenomegaly:
- Corpulmonale : Bilharzial - Hypoxic (with cardiac cirrhosis)
- Miliary TB, Sarcoidosis & Amyloidosis

### ❖ Neurological examination

- Neuropathy or myopathy as paramalignant syndrome in bronchogenic carcinoma
- Pott's disease
- Meningeal irritation (T.B.)

# Local Examination Of Chest Case

**❖ Rules :**

1. Good light
2. Exposure the patient's chest from umbilicus upwards.
3. Position of the patient supine with the head of the table slightly flexed
4. Always examine from the patient's right side
5. Make sure that the patient is comfortable in this position

**❖ Examination:**

| I. Inspection | II. Palpation | III. Percussion | IV. Auscultation |
|---|---|---|---|
| • أثناء الفحص يتم الفحص بمقارنة كل area بالأخرى أو كل space بآخر : | | | |
| ○ Area ⇔ Area | ○ Area ⇔ Area | ○ Space ⇔ Space | مسموح بالاتنين<br>○ Area ⇔ Area or<br>○ Space ⇔ Space |

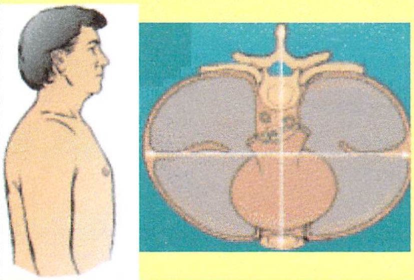
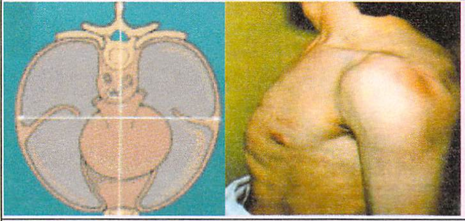
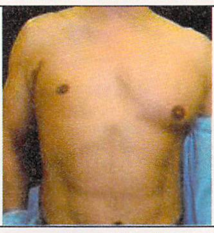
**❖ قوانين الفحص :**

- إبدأ من normal healthy side
- لو المرض bilateral إبدأ بأي ناحية , بس بكل فحص إبدأ بالناحية اللي اخترتها
- مقارنة كل Aspect بالأخرى:
  - ➢ العيان نايم وأيده جنب منه front ⇔ front
  - ➢ العيان نايم وأيده فوق راسه lateral ⇔ lateral
  - ➢ عند فحص ال back ⇔ back :
    - ○ العيان جالس وأيده بجانبه: supra-scapular area
    - ○ العيان جالس ومربع أيده أو حاضن نفسه inter-scapular & infra-scapular

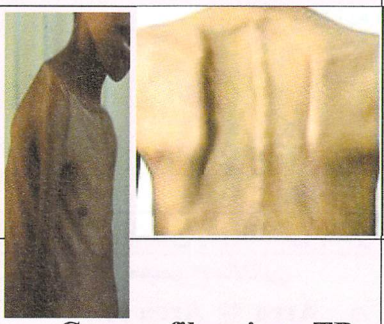
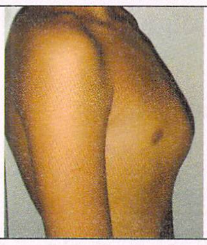
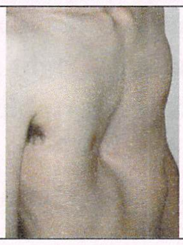
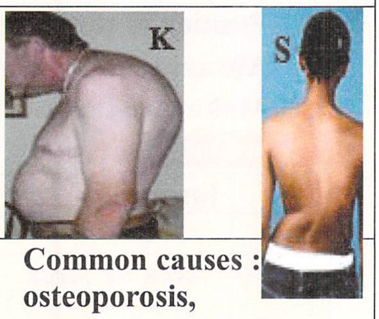
## I. Inspection

### 1) Shape & Symmetry:

- ○ اوقف من عند حرف السرير وبص tangential وقول للعيان وقف نفسك وشوف تضاريس منطقة الصدر
  وقارن كل area بالأخرى supra-mammary area, mammary area & infra-mammary area
- ○ هل هي متساوية symmetrical ولا فيه حتة نازلة وحته طالعة asymmetrical ؟

| A. Normal *symmetrical* chest | B. Abnormally : | | |
|---|---|---|---|
| | I. *Symmetrical* deformities | II. Asymmetrical deformities | |
|  |  | |  |
| | 1) Barrel (emphysematous) chest | 2) Unilateral retraction | 3) Unilateral bulge |
| ○ **Shape :** elliptical | ○ **Shape :** barrel & symmetrical bilateral hyperinflated chest | A. Differentiated by chest expansion (diseased part moves less) | |
| ○ **Diameter:**<br>Antro-posterior < transverse diameter (5 : 7) | ○ **Diameter :**<br>Antro-posterior diameter ≥ transverse diameter | B. Causes : | |
| ○ **Subcostal angle:** ≤ 90° | ○ **Subcostal angle:** wide > 90° | ○ Fibrosis<br>○ Collapse | ○ **Pleura :** Pleural effusion, pneumothorax, empyema necessitans<br>○ **Lungs :** unilateral emphysema<br>○ **Cardiac :** precordial bulge (RV ++, pericardial effusion)<br>○ **Chest wall :** Subcutaneous emphysema |
| ○ **Ribs :** oblique<br>○ **Intercostal space:** narrow normal<br>○ **Spine , vertebral column :** normal curvature | ○ **Ribs :** horizontal<br>○ **Intercostal spaces:** wide<br>○ **Shoulders :** raised<br>○ **Sternum :** prominent<br>○ **Spine :** Kyphosis | | |

**Other abnormalities of the shape :**

| ↳ *Symmetrical* deformities | | | ↳ Asymmetrical deformity |
|---|---|---|---|
| ❖ Flat chest<br>"alar chest" | ❖ Pigeon's chest<br>"pectus carinatum" | ❖ Funnel chest<br>"pectus excavatum" | ❖ Thoracic kyphoscoliosis |
|  |  |  |  |
| ○ Cause : fibrosis as TB | ○ Bone softening diseases: Ricketts, Marfan syndrome | ○ Congenital<br>○ May be acquired in shoemakers | ○ Common causes : osteoporosis, osteoarthritis & TB |
| ○ Winged scapula<br>○ Decreased AP diameter<br>○ Ribs :More oblique | ○ Prominent sternum with foreword protrusion,<br>○ ↑ A-P > transverse diameter | ○ Inward depression of lower part (or the whole) sternum<br>○ Effect: compress RV with ischemia of lung | ○ Curved spine & chest shows the corresponding deformities<br>○ Kyphosis : abnormal AP curvature of spine<br>○ Scoliosis : abnormal lateral curvature of spine |
| | | | ○ Effect :cor pulmonale |

## 2) Chest expansion:

- ❖ اوقف من عند حرف السرير وبص tangential وقول للعيان خد نفس جامد من بقك وخرجه
- ❖ شوف الصدر بيتحرك كويس ولا لأ ؟
- ❖ لو لأ : هل الحركة قلت على الناحيتن ولا ناحية واحدة ؟
  - ○ لو على الناحيتن : bilateral limitation
  - ○ لو على ناحية واحدة يبقى : unilateral limitation : الناحية المصابة هي اللي بتتحرك أقل مع النفس

| ❖ Normally | ❖ Abnormally : limitation of movement detect the diseased side | |
|---|---|---|
| ▪ Chest moves freely with respiration | ▪ Bilateral limitation | ▪ Unilateral limitation |
| ▪ Accurate done by tape test; see later | ▪ In bilateral chest disease e.g. Emphysema, bronchiectasis | ▪ On the affected side e.g. Fibrosis, collapse. |

## 3) Chest wall abnormality; examine the front, sides & BACK of the chest

1. **Skin lesions:** e.g. pigmentation, Campbell de Morgan spots, spider nevi, ulcers, … etc.
2. **Scars :**

Chest Tube

Aspiration of pleural effusion

- Intercostal chest tubes : over axillary areas
- Aspiration of pleural effusion : over the back in infra-scapular region

3. **Dilated veins** filling from above downwards in SCV obstruction & mediastinal syndrome
4. **Ribs & intercostal space:**

| ❖ Normally : | ❖ Abnormally: | |
|---|---|---|
| ▪ Normally oblique | ▪ In emphysema horizontal | ▪ In fibrosis more oblique |

## 4) Respiratory Movement:

### 1. Type of respiration :

| ❖ Normally | ❖ Abnormally | |
| --- | --- | --- |
| ▪ Inspiration is affected by contraction of intercostal muscles & diaphragm<br>▪ Expiration is a passive process, dependent on elastic recoil of lungs | ▪ Abdominal respiration | ▪ Thoracic respiration |
| ▪ In females : respiration is predominantly thoracic (Thoraco-abdominal)<br>▪ In males : respiration is predominantly abdominal (Abdomino-thoracic) | ☞ Causes | |
| | ▪ Intercostal muscle paralysis (poliomyelitis)<br>▪ COPD , Pleurisy, pleural effusion<br>▪ Ankylosing spondylitis | ▪ Phrenic nerve paralysis "diaphragmatic paralysis"<br>▪ Abdominal distention (ascites, pregnancy)<br>▪ Peritonitis |

### 2. Respiratory rate :

- Normal rate : 12 – 20 /min (pulse : respiration ratio = 4 : 1)

- عده من صدر أو بطن العيان في دقيقة كاملة واعمل نفسك بتعد ال Pulse

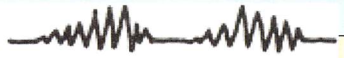
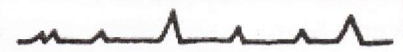
☞ Abnormality in rate :

| A. Bradypnea: below 12 | B. Tachypnea: above 20 |
| --- | --- |
| ▪ ↑ ICT, inhibition of RC (morphine, alcohol) | ▪ All causes of acute dyspnea & fever |

### 3. Rhythm :

- Normal rhythm : regular and quiet with expiratory phase lasts about 1/3 as long as inspiratory phase

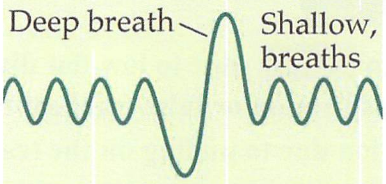
☞ Abnormality in Rhythm:

| A. Cheyne – stokes breathing | B. Biot's (ataxic) breathing |
| --- | --- |
| ❖ Definition: | |
| ○ A period of apnea for 1/2 min., followed by gradual hyperpnea then gradual hypopnea till apnea occur & so on  | ○ Unpredictable irregularity breaths may be shallow or deep & stop for short periods  |
| ❖ Causes: | |
| ▪ ↓ Sensitivity of RC to Co2 as in :<br>○ Elderly (during sleep)<br>○ Inhibited RC : cerebral atherosclerosis, respiratory Failure, narcotics, ↑ ICT | ▪ Meningeal irritation e.g. meningitis<br>▪ Subarachnoid hemorrhage |

### 4. Depth :

- Normal depth : average i.e. Full expansion of the chest wall with full relaxation

☞ Abnormality in depth:



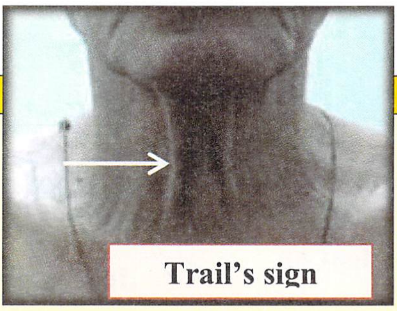
| A. Hyperpnea (rapid deep) | B. Hypopnea (shallow) |
| --- | --- |
| ▪ Acidosis "Kussmaul's respiration" in DKA & Chronic Renal Failure<br>▪ Psychogenic (sighing respiration)<br>▪ Exercise , emotional stress | ▪ Rapid shallow : left side HF , pneumonia<br>▪ Slow shallow: Inhibited RC by drugs e.g. barbiturates |

## 5) Pulsations : see cardiology

A. Apical pulsations, Pulmonary pulsations for pulmonary hypertension , Left parasternal pulsations

B. Epigastric pulsations; in cor pulmonale, RVE is diagnosed by epigastric pulsation (source from above).

## 6) Position of mediastinum:



### A. Apex

**Value of apex in chest cases:**

**A. Chest causes of Shifted apex:**
- Pulling of apex : fibrosis & collapse
- Pushing: pleural effusion, pneumothorax
- Upward : diaphragmatic paralysis

**B. Chest causes of Absent apex :**
  - Obesity, behind a rib
  - Emphysema, left sided pneumothorax or Pleural effusion

**C. In corpulmonale : RVE** (shifted out + diffuse)

**D. Congenital dextrocardia :**
- In Kartagner syndrome "immotile cilia syndrome": absent frontal sinuses or frontal sinusitis, congenital bronchiectasis, decrease ciliary movement: infertility , dextorocarida

### B. Trachea

A. **Normally trachea is central** with both tendon of stenomastoid is **symmetrical** in shape & position.

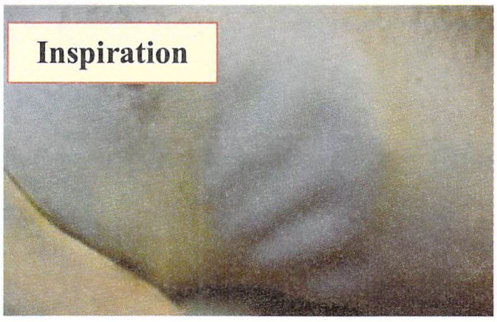
B. **Abnormally: shifted;**
- **Stemomastoid (Trail's) sign:** in THIN patients: **unilateral bulge of stemomastoid tendon** on side of tracheal shift due to displacement of trachea behind the tendon.
- يفضل والمريض جالس , القي نظريتن على ال tendons مرة من الأمام ومرة من الجنب

## 7) Signs of respiratory distress:

❖ Comment on SACT

### I. Sign of respiratory distress:

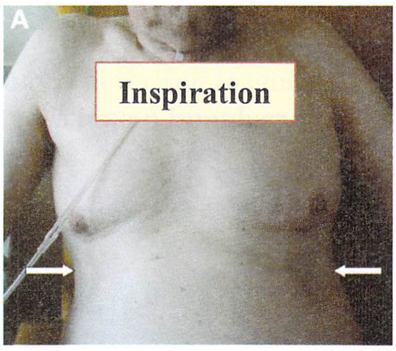
1. **Littin's Sign :**



☠ Littin's Sign ≠ Litten's sign خد بالك في فرق ما بين ال

- **Normally** there is Inspiratory indrawing of **lower intercostal space** on chest sides due to diaphragmatic descent
- **It's exaggerated in** obstructive lung diseases (marked inspiratory indrawing & expiratory fullness of ICS)
- **It's absent in** obesity, pleural effusion, diaphragmatic paralysis

2. **Hoover's Sign:**



☠ **Remember : 2 Hoover sign :**
1. **Chest :** Inspiratory indrawing of costal margin in COPD due to low flat diaphragm
2. **Neurology:** in hemiplegia to differentiate between organic and hysterical causes ( See later )

- Inspiratory indrawing of **costal margin** in **COPD**; due to **low flat diaphragm** (reverse of the normal)

3. **Campbell's Sign or Tracheal Tug with inspiration or false tracheal tug:**
- Descent of cricoid cartilage with inspiration due to pulling on the trachea during inspiration by **strong diaphragmatic** contraction in **COPD**
- Patient head is extended, the tip of index is placed below cricoid cartilage with slight pressure upwards → sudden jerky downwards movement of trachea (tugged) sufficiently to squeeze the finger can be felt **with inspiration**

4. **Crico-Sternal distance = tracheal length:**
- **Technique** to measure this space, insert two or three fingers between the cricoid cartilage and the suprasternal notch
- **Normally:** the trachea can be palpated from the cricoid to the suprasternal notch (crico-sternal distance); this distance is 3-4 fingerbreadth.
- **Abnormally:** If less than 3 finger breadths; this indicates hyperinflation of the lung (**COPD**).

## II. Manifestations of respiratory failure: Types II, ( O2 < 60 mmHg, Co2 > 50 mmHg)

Respiratory failure is a laboratory diagnosis (ABG)

1. Working Ala nasi
2. Abnormal movement of Accessory muscles:

**Normally** :

- ○ No over action of accessory muscles of respiration
- ○ Muscle of inspiration : diaphragm & intercostal muscles
- ○ No muscles for expiration as it is passive process

**Abnormally:**

**A. Abnormal inspiratory movements:**

1) Contraction of inspiratory accessory muscles :

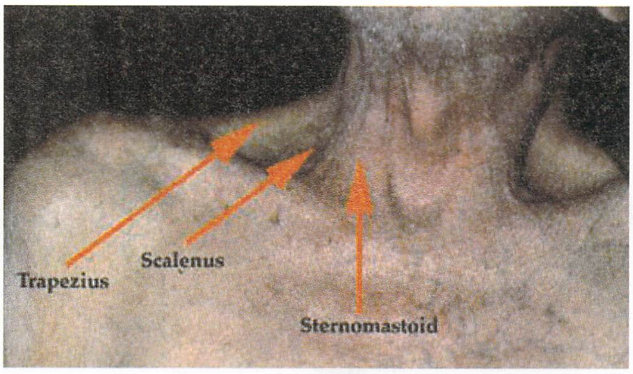
- Trapezii, Scalenus muscles, Sternomastoids

2) Thoracic up lift :

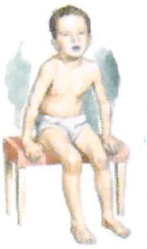
elevation of thoracic cage due to sternomastoid contraction

3) Exaggerated indrawing of:

- Supraclavicular fossae
- Suprasternal
- Intercostal spaces



**B. Abnormal expiratory movements:**

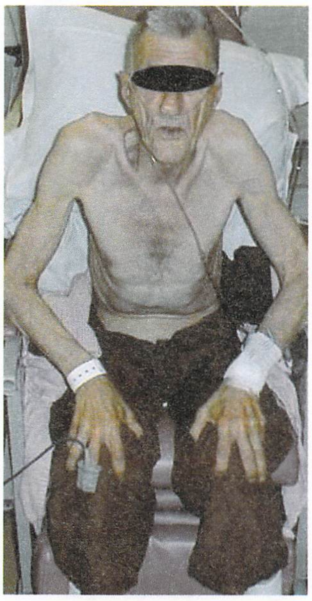


1. Contraction expiratory accessory muscles:

- Abdominal muscles
- Latissimus dorsi

2. Tri-pod position: Patient sit upright & grasp a bed table or back of a chair

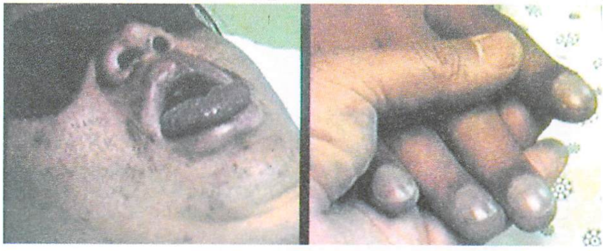
- To fix shoulder girdle, so that latissimus dorsi can be used for approximating ribs
- Augmenting expiratory efforts.



3. Pursing lips :

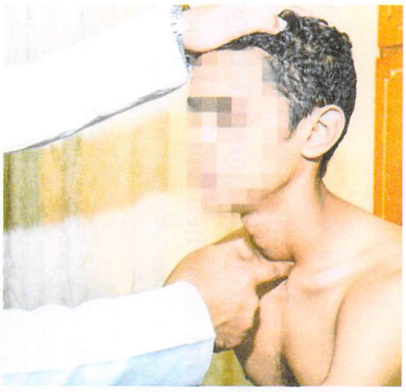
- To keep intrabronchial pressure high above that of surrounding alveoli
- And so preventing collapse of bronchial wall during expiration

3. Co2 narcosis {(hypercapnic encephalopathy): hypersomnia & drowsiness},
4. Central Cyanosis
5. Clubbing
6. Flapping Tremors (asterixis)
7. Tachypnea
8. Tachycardia



## II. Palpation

### 1) Position of mediastinum:



A. **Apex:** see cardiology

B. **Trachea:**

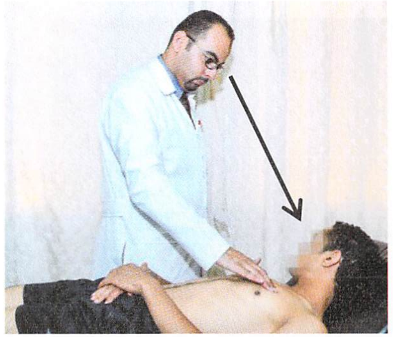
❖ Technique :

- ○ Ask the patient to sit & centralize his head using your left hand on his vault
- ○ Try to insinuate your index finger with its PALMER aspect between trachea & sternomastoid tendon on sides
- ▪ Normally: central : same distance on both sides
- ▪ Abnormally: shifted : unequal distance being narrow at the side of tracheal deviation

❖ Causes of mediastinal shift:

| A. Shift of apex alone | B. Shift of trachea alone | C. Shift of trachea & apex : |
|---|---|---|
| ▪ Cardiomegaly<br>▪ Dextrocardia<br>▪ Moderate pleural effusion | ▪ Superior mediastinal tumor<br>▪ Retrosternal goiter | ▪ Pulled to same side :<br>○ Fibrosis, collapse<br>▪ Pushed to opposite side<br>○ Effusion, pneumothorax |

## 2) Tenderness:



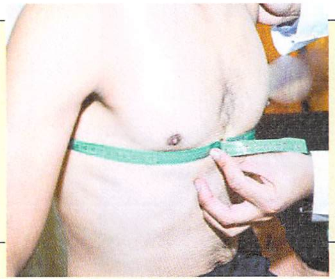
A. Palpate gently overt the chest wall while inspecting the patient's face.

B. Causes of tenderness over chest wall :

- **Over ribs :** fracture, inflammation, tumors, Tietz syndrome (costo-chondritis)
- **Over intercostal spaces :** myalgia, neuralgia (Herpez Zoster; unilateral & dermatomal), pleurisy, empyema
- **Over sternum :** leukemia

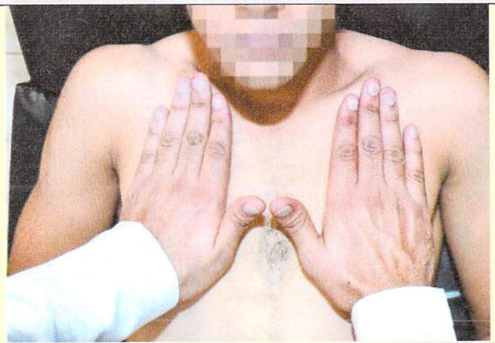
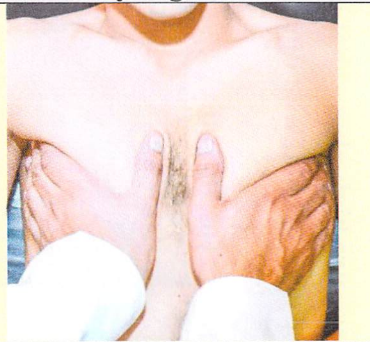
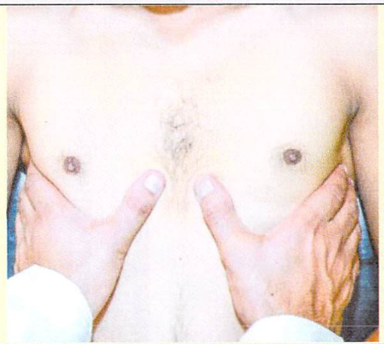
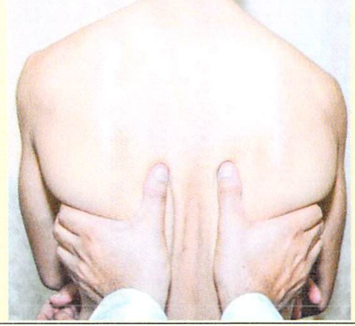
## 3) Chest expansion:

### I. Accurate method: Tape test :



- Put the tape around the chest wall, at or below fourth intercostal space (i.e. at the level of the nipple) , with zero of the tape at anterior midline
- Measure chest circumference at full expiration & full inspiration,:
  - ○ **Normally:** the difference should be 3 – 5 cm
  - ○ **Abnormally:** ≤ 2.5 cm there's generalized restriction of chest mobility as COPD

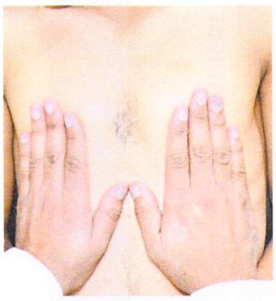
### II. Other method:

<table>
<tr><th colspan="3">A. Expansion of lung zones :</th><th>B. Expansion of the back :</th></tr>
<tr><td>1. Upper lung zone (including lung apices), above the second rib in supra-mammary region</td><td>2. Middle lung zone, from the second rib to the fourth rib in mammary region</td><td>3. Lower lung zone, below fourth rib in infra-mammary region</td><td>❖ Infra-scapular area at level of T10 i.e. just below the angle of scapula</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>❀ العيان نايم supine<br>❀ ضم صوابعك على بعض ما عدا ال thumb واحط ايدي الاتنين على ال chest كل واحده في ناحية بحيث تكون أطراف الأصابع على ال clavicle وال thumbs 2على نفس المستوى وباصيين للسقف<br>❀ اطلب من العيان ان ياخد نفس من بقه ولاحظ حركة اليد لفوق وتحت antro-posterior</td><td colspan="2">❀ العيان نايم supine<br>❀ ضم صوابعك على بعض وابعدهم عن ال thumb وخليها تلف حوالين صدر العيان وحط كل ايد على جنب العيان بحيث يكون ال thumbs 2 في المنتصف عند مستوى ال mammary region or infra-mammary region<br>❀ قرب ايديك الاتنين من بعض بحيث تاخد thin fold of skin بين ال thumbs 2<br>❀ اطلب من العيان ان ياخد نفس من بقه ولاحظ ابتعاد ال thumbs 2 عن بعض laterally اثناء ال inspiration المفروض يبقى أكبر من 5 سم</td><td>❀ تتعمل في ال infrascapular بس<br>❀ وبنفس طريقة ال fold of skin السابقة<br>❀ ولكن العيان قاعد ومربع أيديه</td></tr>
</table>

### Causes of limited chest expansion :

| ❖ Bilateral limitation | ❖ Unilateral limitation |
|---|---|
| ▪ In bilateral chest disease e.g. Emphysema, bronchiectasis | ▪ On the affected side e.g. Fibrosis, collapse, pleural effusion, pneumothorax & pneumonia |

### 4) Subcostal angle:



- **Technique :** thumb test
- **Normally :** acute to right angle (70º–90º)
- **Abnormally:** Obtuse angle: emphysema, upper abdominal swellings & ascites

### 5) Pulsations: see cardiology

- Confirm pulsations (apex, pulmonary, left parasternal pulsation, epigastric) : see cardiology.
- **Importance of that pulsation in chest case: this may diagnose cor-pulmonale**

Cor- pulmonale : Parenchymal or vascular lung disease → P.HTN → RVE → ± RV failure

**Manifestation of cor-pulmonale :**

- Manifestation of primary **chest disease** : Symptoms + Signs (see before)
- Manifestation of **pulmonary hypertension** : Symptoms + Signs (see cardiology)
- Manifestation of right ventricular **enlargement** and or right ventricular **failure** :

| ❖ RVE | ❖ RV failure |
|---|---|
| ▪ **Left parasternal pulsation :** maybe *not felt* as mostly the patient had emphysema<br>▪ **Apex pulsation :** weak or *absent* as mostly the patient had emphysema, but if detected it will be diffuse and shifted outwards<br>▪ **Epigastric pulsation** : may be detected due to RVE or liver congestion as a result of cor-pulmonale | ▪ **Congested pulsating neck veins *with expiratory filling***<br>▪ **LL edema**<br>▪ **Enlarged tender pulsating liver**<br>▪ **Ascites**<br>▪ **Tricuspid gallop & functional tricuspid incompetence murmur:** it's specific for RVF |

### 6) Tactile vocal fremitus (TVF):

**❖ Definition:**

- Palpable vibration of vocal cords transmitted through respiratory passage to be felt on chest wall.
- It is done by applying hand on chest wall and ask patient to repeat "99" or in Arabic "44"

**❖ Normally :**

- TVF is equally on in each two corresponding areas of the chest except:
  Right 2nd space in parasternal line (Right upper lobe); TVF is increased because :
  - Trachea is in contact with Right lung apex
  - Right apical bronchus is more superficial (superior)

**❖ Abnormally :**

| ❖ Causes of increased TVF = causes of bronchial breathing = causes of ↑ vocal resonance | ❖ Causes of decreased TVF |
|---|---|
| ▪ Consolidation (pneumonia)<br>▪ Cavity if : big, superficial & surrounded by consolidation<br>▪ Collapse or fibrosis if associated with patent bronchus<br>▪ Upper level or pleural effusion | ▪ All other chest diseases: Causes of ↓ TVF = causes of ↓ intensity of breath sounds = causes of ↓vocal resonance (see later) |

**❖ Technique : see below**

### 7) Palpable adventitious sounds:

**❖ Comment on SACT:**

1. **Site: = causes of Palpable Ronchi:**
   - Generalized e.g. bronchitis or bronchial asthma
   - Localized e.g. partial obstruction by tumor or foreign body or secretions
2. **Which Adventitious sound :**
   - Palpable ronchi in bronchitis (DD with thrill by stopping breathing)
   - Palpable rub in pleurisy
   - Palpable crepitations
3. **Relation to Cough:**
   - Persist or disappear due to secretions
4. **Timing:**
   - Inspiratory or expiratory or both

**❖ Technique : see below**

## 6) Tactile vocal fremitus (TVF)

## 7) Palpable adventitious sounds

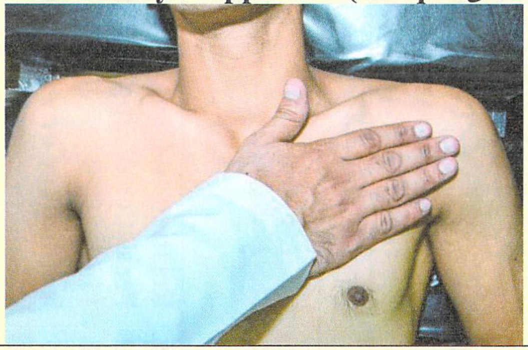
- ❖ **Technique: By the same hand, comparative; area by area in each two corresponding symmetrically areas (Right to Left) by placing the hand ball of the palm while tips directed laterally.**

- ❖ **Compare intensity of vibrations while the patient is repeating "99" or in Arabic "44"**
- ❖ **Some schools may feel the TVF by the ulnar border of hand اطلب من العيان انه يقول اربعه اربعه في كل منطقة**

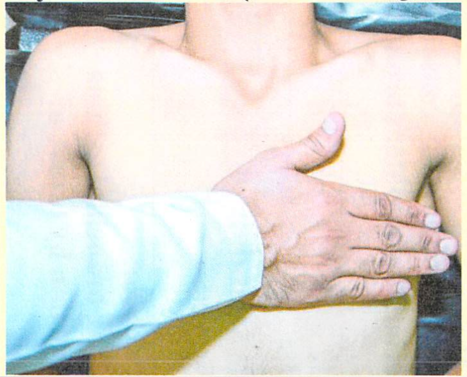
- ❖ **Ask the patient to take deep respiration and then comment on SACT اطلب من العيان انه ياخد نفس من بقه في كل منطقة**

### 1. Anteriorly: BOTH SIDES : العيان نايم وايده جنبه

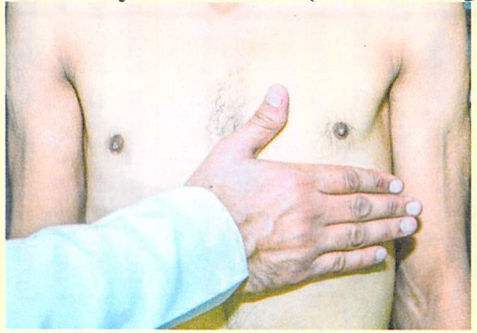
**A. Supra-mammary = upper 1/3 (oblique ايد الدكتور تبقى )**



**B. Mammary = middle 1/3 (horizontal ايد الدكتور تبقى )**

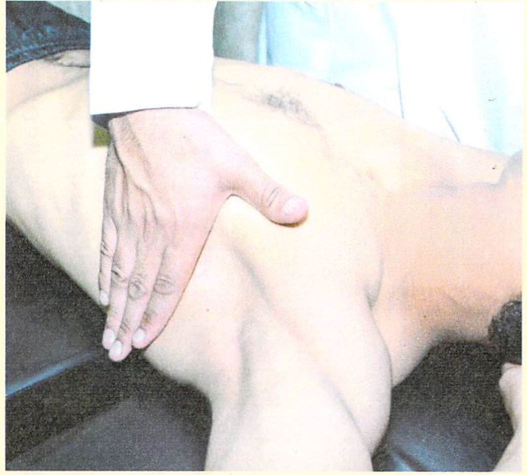


**C. Infra-mammary = lower 1/3 (horizontal ايد الدكتور تبقى )**

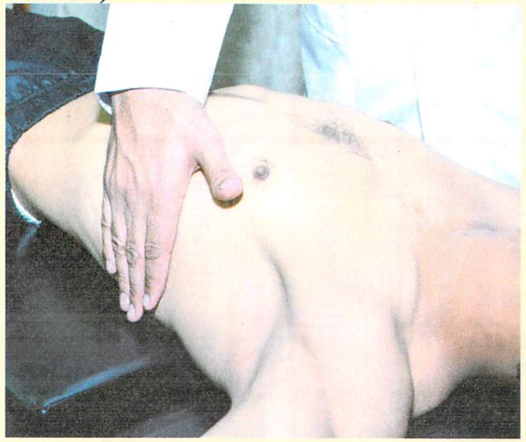


### 2. Laterally: BOTH SIDES العيان نايم وايده فوق راسه

**A. Upper axillary (upper ½) (horizontal & fingers towards the bed)**

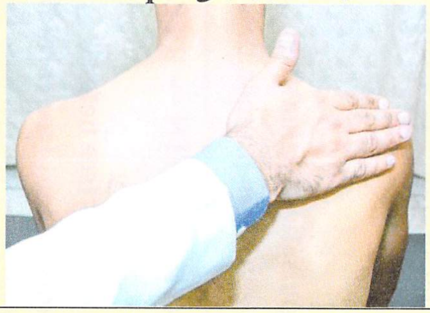


**B. Lower axillary (lower ½) (horizontal & fingers towards the bed)**

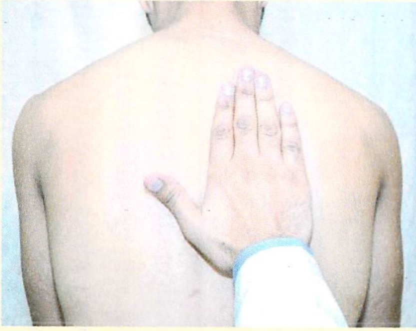


### 3. Posteriorly : BOTH SIDES العيان جالس

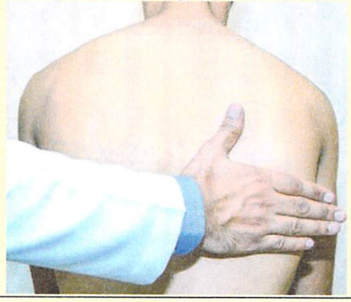
**A. Supra-scapular (above spine)**
**Oblique ايد الدكتور تبقى**



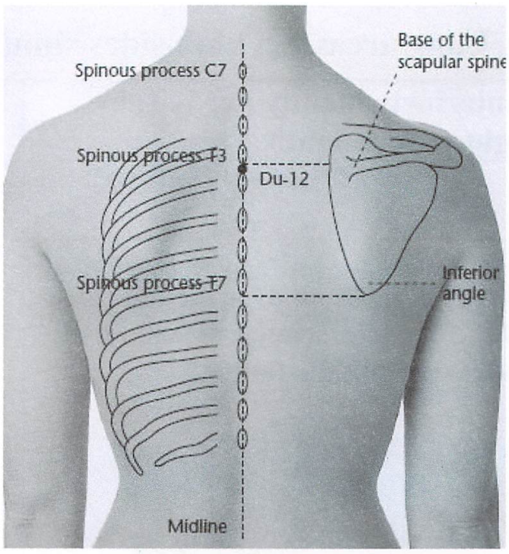
**B. Inter-scapular (between scapulae)**
**vertical ايد الدكتور تبقى**



**C. Infra-scapular (below scapula)**
**horizontal ايد الدكتور تبقى**



## III. Chest Percussion


Spinous process C7
Base of the scapular spine
Spinous process T3
Du-12
Spinous process T7
Inferior angle
Midline

I. **Hepatic dullness (see cardiology)**

II. **Heart percussion (see cardiology)**

II. **Chest wall:**

A. **Lung proper : Light percussion, except back by heavy percussion**
- ○ **Lung (front, side, back)**

B. **Special areas by light percussion :**
1. **Bare area of the heart: see cardiology**
2. **Kronig's Isthmus**
3. **Traub's area**

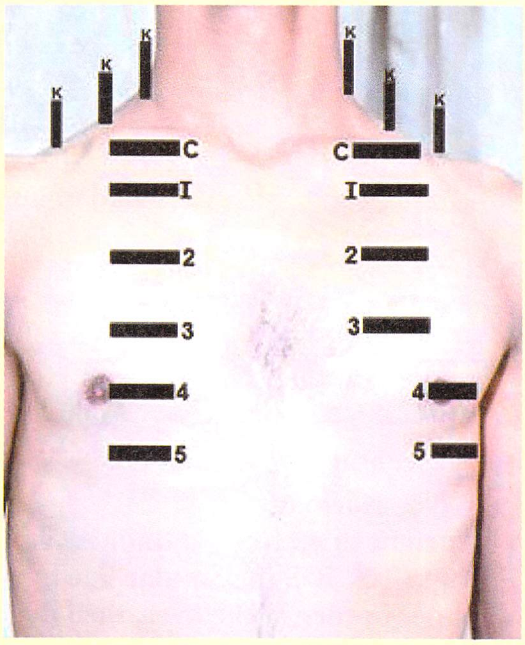
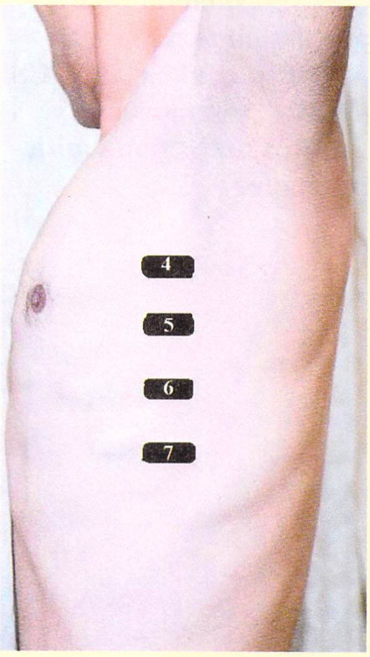
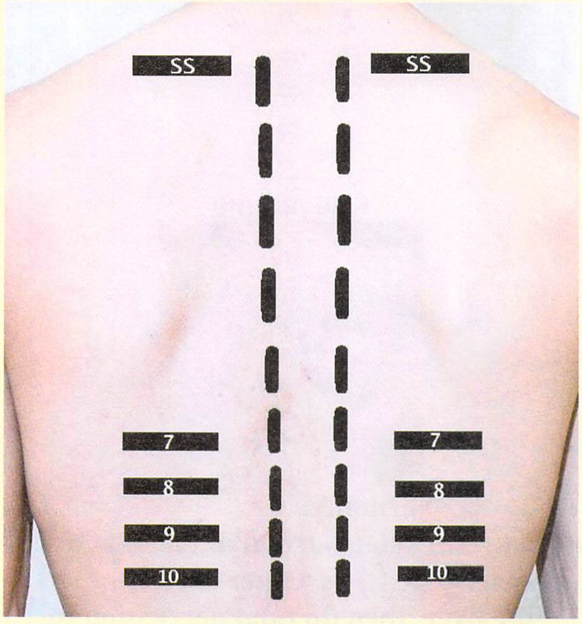
A. **Special test: shifting dullness.**

❖ **Revision of the anatomy :**

→ **The scapula covers from 2nd to 7th rib with the arm at the sides and the inferior angle of scapula is usually at the 7th intercostal space.**

### ❖ Grades of percussion note:

| A. Resonance | | | B. Dullness | | |
|---|---|---|---|---|---|
| 1. Normal resonance | 2. Hyperresonance | 3. Tympanitic resonance | 1. Slight dullness (Impaired note) | 2. Dullness | 3. Stony dullness |
| ❖ Causes | | | | | |
| ▪ Normally:<br>○ Lung & free abdomen | ▪ Emphysema : encroach the normal dullness of bare area and or upper hepatic border due to hyperinflation of the chest. | ▪ Air:<br>○ Empty stomach<br>○ Pneumothorax<br>○ Lung cyst<br>○ Emphysematous bullous | ▪ Normally : scapulae<br>▪ Abnormally: Minor<br>○ Consolidation<br>○ Collapse<br>○ Fibrosis | ▪ Normally :<br>○ Heart, liver<br>▪ Abnormally: Massive:<br>○ Consolidation<br>○ Collapse<br>○ Fibrosis | Pleural effusion |

| ❖ Areas of percussion : | | |
|---|---|---|
| • Anterior | • Lateral | • Posterior |
|   K<br>K<br>K<br>K<br>K<br>K<br>C<br>C<br>I<br>I<br>2<br>2<br>3<br>3<br>4<br>4<br>5<br>5 |  |   SS<br>SS<br>7<br>7<br>8<br>8<br>9<br>9<br>10<br>10 |
| • K : Kronig's isthmus<br>• C : Clavicle<br>• I : Infra- clavicular<br>• Numbers : Spaces | • Numbers : Spaces | • SS : Supra-Scapular<br>• Vertical Lines: Inter-scapular<br>• Horizontal lines : Infra-Scapular |

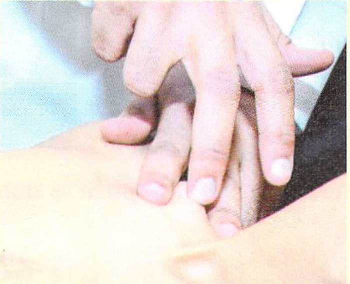
## 1) Lung areas, on both sides simultaneously, comparative: area by area:

### 1. Anteriorly mainly in MCL by light percussion:

- ○ العيان نايم وايده جنبه

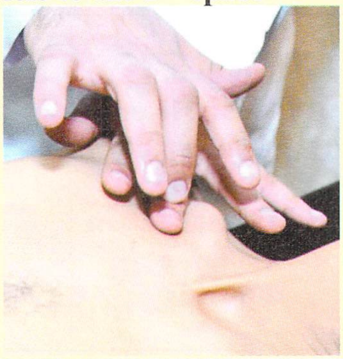
**A. Clavicle;**

- ○ **Direct percussion over medial third of the clavicle, stretch the skin by index and middle finger.**



- ○ شد الجلد من على ال clavicle وضع صباعين ال middle finger& index على شكل حرف تمانية وخبط بايديك اليمين (ده علشان صباعك ميتزحلقش)

**B. Infra-clavicular region:** from the clavicle to the 2nd space



**C. Space by space:**

Both sides from 2nd → 6th at MCL except left 4th & 5th spaces at AAL

2 ⇔ 2
3 ⇔ 3
4 ⇔ 4
5 ⇔ 5
↓
End of lung

➩ **Normally:**

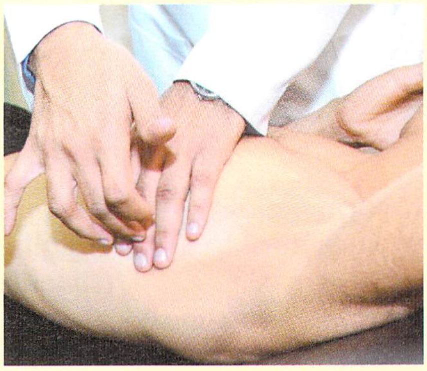
- ○ **At right side:** Normal dullness at 6th space (MCL) by upper border of the liver. then do tidal percussion to make sure
- ○ **At left side:** at 6th space (MCL) ↑ resonance: Traub's area "tympanitic resonance"

### 2. Laterally mainly in MAL by light percussion in

- ○ العيان نايم وأيده فوق راسه

4th space → 7th space

4 ⇔ 4
5 ⇔ 5
6 ⇔ 6
7 ⇔ 7
↓
End of lung



- ○ قارن كل space ⇔ space بداية من الرابع لأنه أول space تقدر توصله والأفضل انك تعد من الأمام وتمشي معاه lateral
- ○ العيان

➩ **Normally:**

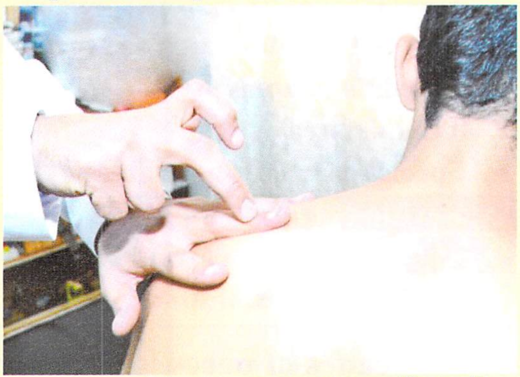
- ○ **At right side:** Normal dullness at Right 8th ICS (MAL) by upper border of the liver. then do tidal percussion to make sure
- ○ **At left side:** at Left 8th ICS (MAL) ↑ resonance: Traub's area "tympanitic resonance"

### 3. Posteriorly by heavy percussion

✌ هيحصل تغيريين:

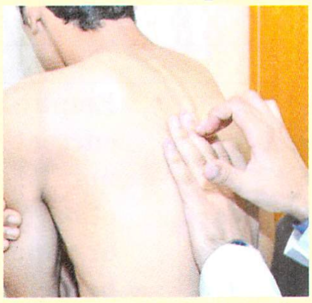
- ○ العيان جالس والدكتور ايده تخبط جامد

**A. Supra-scapular (Trapezius):** above spine of scapula



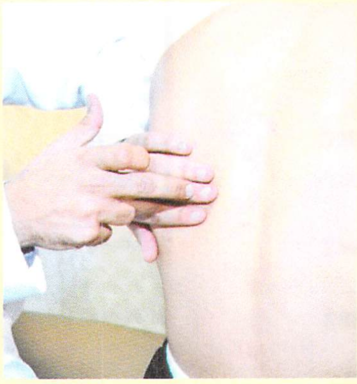
- ○ العيان قاعد وايده جنبه
- ○ ايد الدكتور تخبط جامد وتبقى horizontal

**B. Inter-scapular:** in paravertebral line From 2nd to 10th space



- ○ العيان قاعد ومربع ايده او حاضن نفسه
- ○ ايد الكتور تخبط جامد وتبقى vertical

**C. Infra-scapular:** in scapular line From 7th (scapular angle) → 10th space



7 ⇔ 7
8 ⇔ 8
9 ⇔ 9
10 ⇔ 10
↓
End of lung

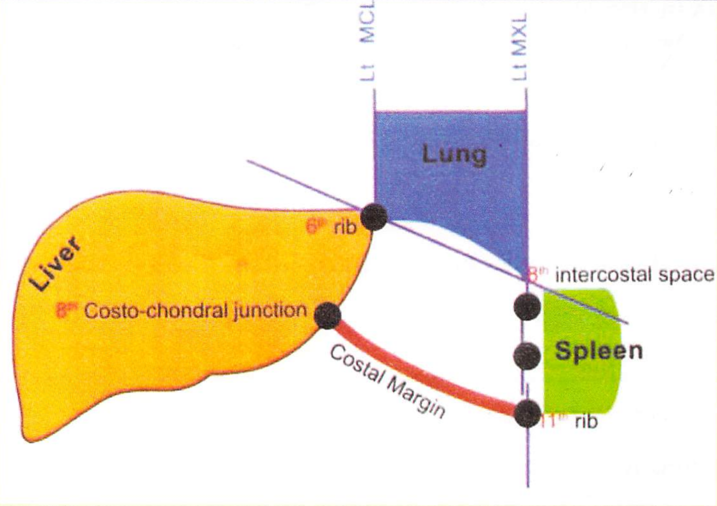
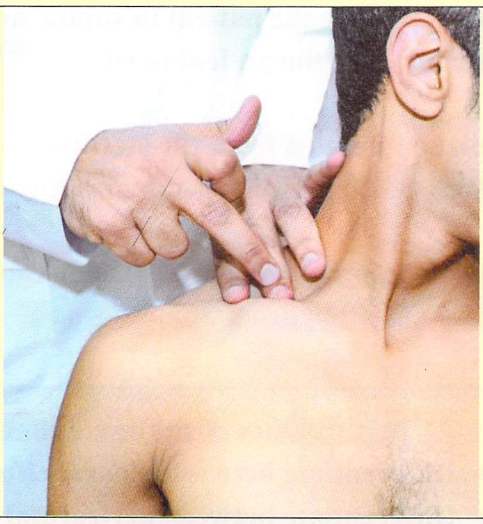
- ○ العيان قاعد ومربع ايده او حاضن نفسه
- ○ ايد الدكتور تخبط جامد وتبقى horizontal

➩ **Normally:**

- ○ **At right side :** Normal dullness at Right 10th ICS in scapular line by upper border of the liver. then do tidal percussion to make sure
- ○ **At left side :** Normal dullness at left 10th ICS in scapular line by anterior border of spleen

---

- ○ **Abnormally:**
  - ▪ Higher level of lung resonance: pleural or pulmonary disease.
  - ▪ Lower level of lung resonance: below 5th space in MCL, in emphysema, pneumothorax

<table>
<tr><th>2) Traub's area</th><th>3) Kronig's isthmus</th></tr>
<tr><td colspan="2">❖ Definition :</td></tr>
<tr><td>▪ An area of tympanitic resonance overlying air bubbles in fundus of stomach<br>▪ Normally: tympanitic resonance<br>▪ Contents of Traub's area: fundus of stomach & left pleura</td><td>▪ A band of resonance overlying lung apex<br>▪ Normally: resonance</td></tr>
<tr><td> </td><td></td></tr>
<tr><td colspan="2">Boundaries & surface anatomy:</td></tr>
<tr><td><table>
<tr><td>1. Right border : left border of liver :<br>○ Left 6th rib MCL → left 8th costal cartilage</td><td>2. Upper border : lower border of Left lung:<br>○ Left 6th rib MCL → left 8th rib MAL</td></tr>
<tr><td>3. Lower border : left costal margin:<br>○ left 8th costal cartilage → left 11th rib MAL</td><td>4. Left border : anterior border of spleen:<br>○ Left 9th rib MAL → left 11th rib MAL</td></tr>
</table></td><td>1) Medially: a line connecting the spine of C7 vertebra to sternoclavicular joint<br>2) Laterally: a line connecting midpoint of spine of scapula to junction of medial 2/3 with lateral 1/3 of clavicle<br>3) Anteriorly: medial 2/3 of clavicle<br>4) Posterior: trapezius muscle</td></tr>
<tr><td>▪ إبدأ من منتصف ال Traub's area متجها لل borders</td><td>▪ المريض جالس ويثني راسه والدكتور من الخلف وخبط من جوه لبره</td></tr>
<tr><td>▪ Technique: by light percussion from center to borders.</td><td>▪ Technique: by light percussion from dullness to resonance</td></tr>
<tr><td><table>
<tr><th>☞ Abnormally</th><th>Causes of Dullness of Traub's area:</th><th>Causes of Increased size of resonance of Traub's area:</th></tr>
<tr><td>▪ Stomach</td><td>1) Full stomach or gastric tumors</td><td>A. Dilated stomach</td></tr>
<tr><td>▪ From above</td><td>2) Lt basal pleural disease (effusion , thickening)<br>3) Pericardial effusion</td><td>B. Lt. Basal lung collapse or pneumonectomy</td></tr>
<tr><td>▪ From below</td><td>4) Elevated diaphragm (ascites, tumor & pregnancy)</td><td>C. Pneumoperitoneum</td></tr>
<tr><td>▪ From right</td><td>5) Hepatomegaly (enlarged left lobe)</td><td>D. Shrunken liver</td></tr>
<tr><td>▪ From left</td><td>6) Splenomegaly</td><td>E. Splencetomy</td></tr>
<tr><td>▪ Congenital</td><td>7) Situs inversus totalis</td><td>F. Congenital eventration of diaphragm</td></tr>
</table></td><td>☞ Abnormally : dullness in Kronig's isthmus → apical lesion, causes include:<br>a) Apical lung lesions :<br>○ TB<br>○ Friedlander's Pneumonia (Klebsiella pneumonia)<br>○ Fibrosis - collapse<br>b) Apical lung tumor: Pancoast tumor<br>c) Apical pleural lesions : Pleural thickening</td></tr>
<tr><td colspan="2">❖ NB:<br>▪ Physiological causes of dullness of Traub's area: full stomach & pregnancy.</td></tr>
</table>

## ❖ Special test: Shifting dullness : to diagnose hydropneumothorax by percussion:

- **Value :** differentiate between pleural effusion & hydropneumothorax
- **Technique :**we percuss in 3 plains while changing patient position:

) **1st plane :** while the patient in supine position , percuss in the MCL till dullness, then proceed one space above (resonant), ask the patient to sit, the resonance will be dull in hydropneumothorax

) **2nd plane :** percuss from the sternum to the axillary line till dullness, ask the patient to lie on the opposite side, the dullness will be resonant in hydropneumothorax

) **3rd plane :** percussion on the back (scapular line) till the dullness, ask the patient to lean forward, the dullness will be resonant in hydropneumothorax

**N.B.: Values of shifting dullness:**

1) Differentiate between pleural effusion & hydropneumothorax
2) Differentiate between pericardial effusion & pulmonary dilatation as a cause of dullness in pulmonary area
3) Ascites

## IV. Auscultation:

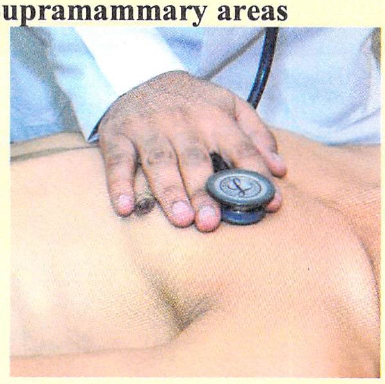
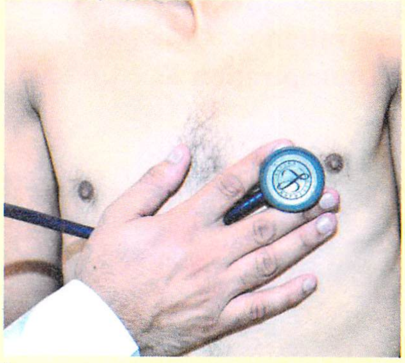
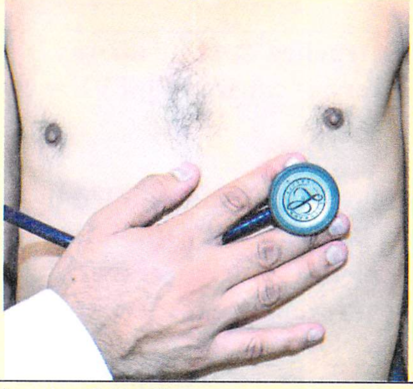
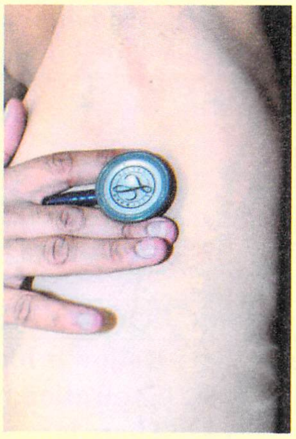
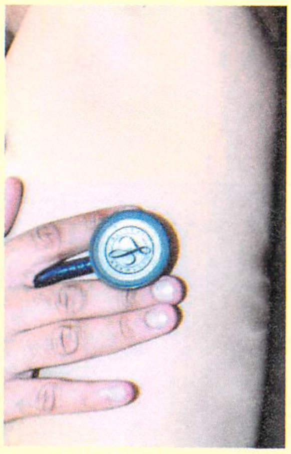
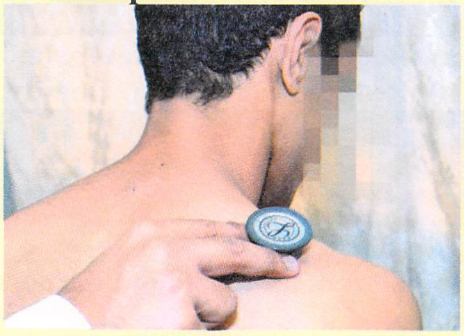
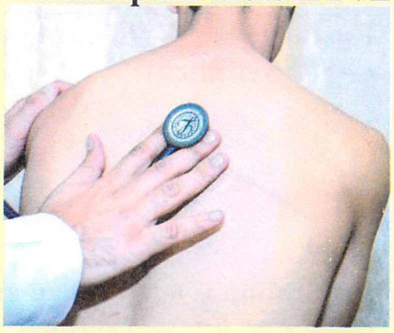
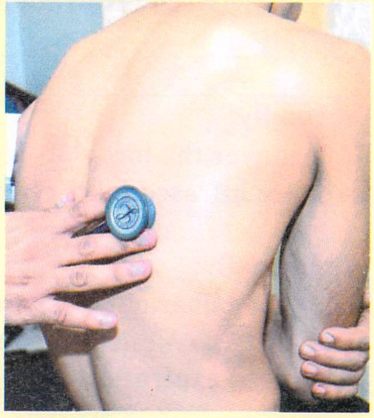
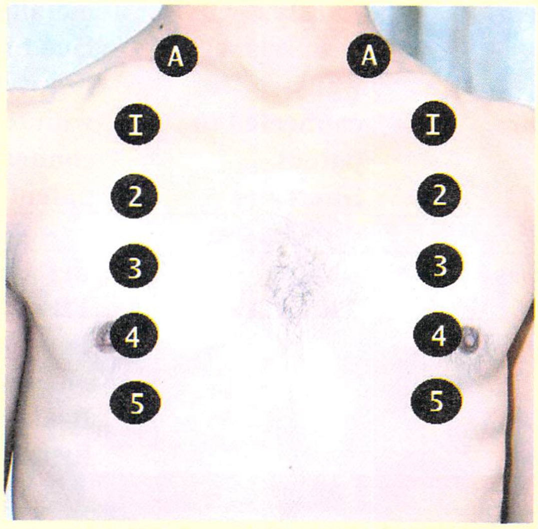
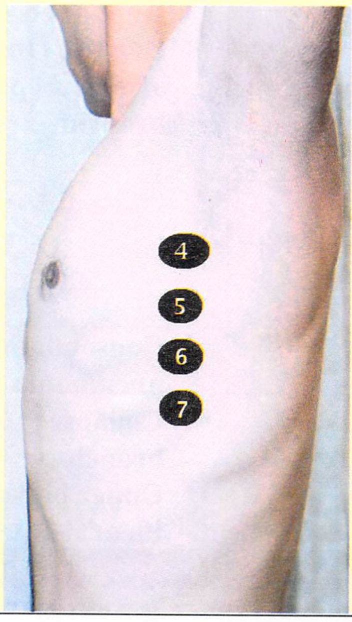
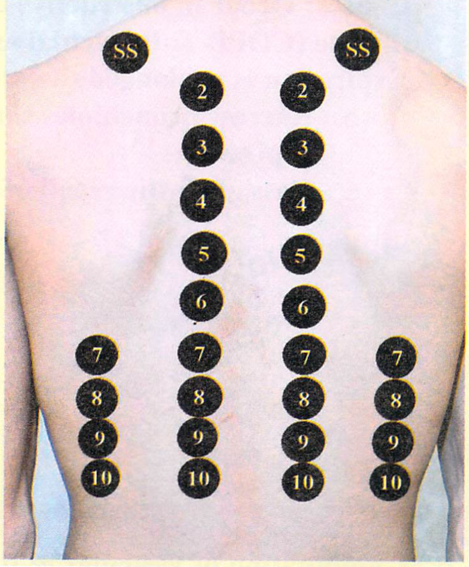
### A. Auscultation for:

1) **Breath sounds:** Vesicular, Bronchial & Broncho-vesicular.
2) **Conducted sounds:** Vocal resonance (Bronchophony, Whispering pectoriloquy, Aagophony)
3) **Adventitious sounds:** Pleural rub, Crepitations & Wheezes
4) **Special test:** Post- tussive suction, Succession splash & Coin test.

### B. Parts of stethoscope used for the sounds :

- We can use either diaphragm or cone (bell) but the **CONE (BELL) IS PREFERRED** due to:
- Most of the sounds reaching the chest wall from the bronchi and lungs are of low pitch.
- To avoid falsely produced sounds as pleural rub or crepitations resulting from stretching of the skin and hairs when using the diaphragm of stethoscope during deep breathing

**C. The maneuver of auscultation:** comparative on both sides either area by area or space by space:

| | 1. Anterior aspect<br>العيان نايم وايده جنبه | 2. Lateral aspect<br>العيان نايم وايده فوق راسه | 3. Posterior aspect<br>العيان جالس |
|---|---|---|---|
| **A. By areas** | ❖ In midclavicular line:<br>○ Supramammary areas<br><br>○ Mammary areas<br><br>○ Inframammary areas<br> | ❖ In mid axillary line:<br>○ Upper axillary areas<br><br>○ Lower axillary areas<br> | ○ Supra-scapular above spine of scapula<br><br>○ Interscapular areas in PVL<br><br>○ Infrascapular areas in SL<br> |
| **B. By spaces** | ▪ Apex of the lung<br>▪ Infra clavicular<br>▪ From 2nd to the 5th space in MCL<br><br> | ▪ From 4th to 7th space<br><br> | ▪ Supra-scapular<br>▪ Interscapular from 2nd to 10th space in paravertebral line<br>▪ Infrascapular from 7th to 10th space in scapular line<br><br> SS SS 2 2 3 3 4 4 5 5 6 6 7 7 7 7 8 8 8 8 9 9 9 9 10 10 10 10 |

## 1) Breath sounds:

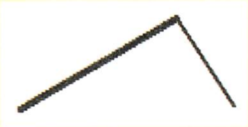
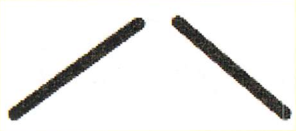
### A. Intensity = loudness of breath sounds:

1) **Normal intensity** : louder in lower posterior lung field
2) **Increased intensity = loud intensity of breath sound** : thin chest & children (puerile breathing)
3) **Decreased intensity = diminished intensity of breath sound = Diminished air entry; due to :**

❖ **Causes of diminished intensity of breath sounds = decreased vocal resonance = decreased TVF :**

a) **Reduced air flow :** Severe late cases of COPD, Bronchial asthma, Collapse & fibrosis
b) **Reduced conduction:** Obesity, Pleural effusion & Pneumothorax

### B. Types of Breath sounds:

| i. Vesicular breathing "alveolar breathing" | ii. Bronchial breathing : |
|---|---|
| ❖ Mechanism: | |
| - Flow of air in and out the normal lung alveoli | - Alveoli out of work + Patent bronchi |
| ❖ Characters: | |
| - Rustling حفيف الشجر = soft خفيف = breezy نسيم (lower pitch)<br><br>- Inspiration is longer than expiration (3:1)<br>- No gap between inspiration & expiration | - Hollow = blowing (higher pitch)<br>- Expiration is ≥ Inspiration<br>- There is gap between inspiration & expiration<br> |
| ❖ Heard over : | |
| **Normally:**<br>• Heard over the lungs & Best heard over axilla & infrascapular regions<br>**Abnormally:**<br>• **Change in character:** Expiration is prolonged → **Vesicular breathing with prolonged expiration**<br>**Characters of Vesicular with prolonged expiration :**<br>- **Character :** Rustling , No gap & expiration is prolonged & usually wheezy<br>- **Causes:** Occur in obstructive airway disease (COPD & Bronchial asthma)<br>- Expiration is prolonged **due to:**<br>○ Narrow bronchioles slows the expiration<br>○ Loss of elastic recoil of the lung. | **Normally heard over** trachea & large airway<br>**Abnormally heard over : = causes of ↑ TVF = causes of ↑ vocal resonance**<br>- Consolidation<br>- Cavity if: big, superficial & surrounded by consolidation<br>- Collapse, fibrosis if associated with patent bronchus<br>- Upper border of pleural effusion (rare)<br>➢ **Confirmed by:** ↑ vocal resonance (especially whispering pectoriloquy) |

❖ **Classification of bronchial breathing according to pitch into 3 types :**

| 1) Tubular | 2) Cavernous: | 3) Amphoric |
|---|---|---|
| ❖ Definition: | | |
| - High pitch<br>- Due to : Obstructed alveoli & patent bronchi | - Low pitch<br>- Due to<br>○ Empty cavity with **relaxed** walls connected to patent bronchus | - Low pitch with superadded metallic tone<br>- Due to :<br>○ Empty cavity with **tense** walls connected to patent bronchus |
| ❖ Causes: | | |
| - Consolidation as pneumonia<br>- Collapse + patent bronchus<br>- Upper border of Pleural effusion | - Lung abscess<br>- TB cavity | - Big abscess<br>- TB cavity<br>- Tension pneumothorax<br>- Bronchopleural fistula |

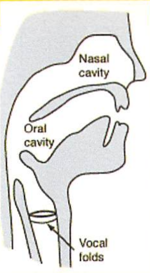
### iii. Broncho-vesicular breathing:

○ **Combination of** vesicular & bronchial types e.g. vesicular inspiration & bronchial expiration.

☞ **Normally** in right lung

☞ **Abnormally** in patchy consolidation

## 2) Vocal resonance



- التنفس الطبيعي بتاع ال vesicular breathing أن ال inspiration أطول من ال expiration بنسبة 3 : 1
- والتنفس الطبيعي والمرضي بتاع ال bronchial breathing أن ال expiration أطول من (أو يساوي) ال inspiration
- والتنفس المرضي بتاع ال vesicular breathing أن ال expiration أطول من ال inspiration اللي بنقول عليه vesicular breathing with prolonged expiration
- فدلوقتي الدكتور لو بيسمع بالسماعة ولاقى ان ال expiration أطول من ال inspiration فهو ادامه احتمالين يا اما هو bronchial breathing او انه vesicular breathing with prolonged expiration
- وهنا تيجي أهميه ال vocal resonance : اللي هي اختبارات معينة بنعملها مع العيان وتثبت ان اللي خلى ال expiration أكبر من ال inspiration هو ال bronchial breathing

- **Definition:** it's vibration of vocal cords transmitted through airway and chest wall to be auscultated
- **Value:** Conducted voice sound, confirm bronchial breathing
- **Technique:** Tested while patient says 44 in Arabic, one one or nine nine in English, compare equivalent areas of chest

### ❖ Types of vocal resonance

| A. Bronchophony | B. Whispering pectoriloquy | C. Aagophony |
|---|---|---|
| ▪ العيان هيقول أربعه أربعه بصوت عادي<br>▪ الدكتور هيسمع الصوت أعلى في مكان ال bronchial breathing | ▪ العيان هيقول أربعه أربعه بصوت منخفض او بهمس<br>▪ الدكتور هيسمع الصوت أعلى في مكان ال bronchial breathing | ▪ العيان هيقول أربعه أربعه بصوت عادي<br>▪ الدكتور هيسمع الصوت مخنف في مكان ال bronchial breathing |
| ○ Normally spoken words are heard louder & clearer | ○ Whispered sound are heard border & clearer | ○ Normally spoken words are heard louder with nasal tone |

- Causes of increased vocal resonance : same causes of ↑ TVF = same causes of bronchial breathing
- Causes of decreased vocal resonance : same causes of ↓ TVF = same causes of diminished intensity of breath sounds

**❖ N.B.: D'espine sign:**

- ○ **Normally :** if you auscultate below the body of T4 (tip of T2 spine), you will hear vesicular breathing
- ○ **Abnormally :** if you heard Bronchial breathing confirmed by ↑ of vocal resonance
- ○ **Significance:** Indicates enlarged mediastinal (Interbronchial) LN e.g.: TB or neoplastic.

## 3) Adventitious sounds:

### A. Pleural rub:

- ○ **Definition :** superficial leathery sound friction sound
- ○ **Causes :**pleural diseases e.g. acute dry pleurisy
- ○ **Timing :** inspiratory & expiratory
- ○ **Site :** localized best heard at lower side of chest
- ○ **Effect of cough :** unchanged by cough
- ○ **Differential diagnosis:**
  - From friction of skin with stethoscope (Pleural rub ↑↑ by firm pressure)
  - From pericardial rub (Pleural rub disappears on holding breath)
  - From other adventitious sounds (Pleural rub unchanged by forceful cough)

### B. Crepitations = Crackles = Rales

### C. Rhonchi (Wheezes)

- In clinical exam if you heard additional sounds (as crepitations or wheezes) comment on SACT:
- Subtype, Area (site), relation to Cough, Timing.
  - E.g. medium sized crepitations over …, (changeable or not) on cough, inspiratory in time.
  - E.g. Sonorous wheezes, generalized, not changeable on cough, expiratory in time.

| B. Crepitations = Crackles = Rales | C. Ronchi (Wheezes) |
|---|---|
| ❖ Definition: | |
| ▪ Interrupted moist wet non-musical sounds | ▪ Continuous dry musical sounds |
| ❖ Mechanism : | |
| 1) Recently : change in the lung elasticity with ↓ alveolar compliance<br>2) Explosive reopening of peripheral of peripheral small airways during inspiration which become occluded during expiration<br>الهوا يحاول دخول ال collapse wall يطرقع<br>3) Passage of air though fluid in bronchi & alveoli | ○ Passage of air in a narrowed bronchus<br>○ لما الدكتور يسألك في wheezes ولا لأ , اوعى تسمع وترد على طول , لكن قول للعيان انهج جامد علشان تزود سرعة الهوا |

| A. Fine | B. Medium sized | C. Coarse | ☝ Monophonic | | ✌ Polyphonic |
|---|---|---|---|---|---|
| | | | A. Sibilant ronchi (wheezes) | B. Sonorous rhonchi | |
| ❖ Character: | | | | | |
| ▪ Frequent (≥6 cycle/min), faint, high pitch | ▪ In-between (3-6 cycle/min) | ▪ Few (1-2cycle / min), loud, low pitched | ▪ High pitched<br>▪ Best heard over sides | ▪ Low pitched<br>▪ Best heard over midline | ▪ Both high & low pitch<br>▪ Best heard over sides |
| ❖ Mechanism = significance of the pitch "Subtype": | | | | | |
| ▪ Passage of air through small amount of fluid in alveoli or small bronchioles | ▪ Passage of air through moderate amount of fluid in alveoli or medium- size bronchi | ▪ Air bubbling through big amount of fluid in alveoli, big bronchi or big cavities | ▪ Severe narrowing of small distal bronchiole e.g. Bronchial A. | ▪ Mild narrowing of big central bronchi e.g. Chronic bronchitis, carcinoma | ▪ Generalized Narrowing of small & big bronchioles e.g. Chronic bronchitis |

| ❖ Site = Area = distribution & it's significance: | |
|---|---|
| ▪ Generalized "Diffuse": e.g. pulmonary edema<br>▪ Localized e.g. :<br>○ If bilateral & basal : bronchiectasis (medium or coarse) or LV failure (fine), normal (fine)<br>○ Tumor, foreign body, secretions | ▪ Generalized "Diffuse": bronchitis, bronchial asthma<br>▪ Localized: tumor, foreign body, secretions |
| ❖ Effect of Cough : changeable or not | ❖ Effect of Cough : changeable or not |
| ▪ Crepitation due to alteration in elastic tissue (e.g. fibrosis) : not changeable with cough<br>▪ While those due to bubbling of air through secretions (e.g. bronchiectasis) are changeable after cough (decrease or disappears) | ▪ Expiratory rhonchi are due to spasm or edema of bronchial wall not changeable with cough<br>▪ While inspiratory rhonchi are due to secretions in the bronchi changeable with cough (decrease or disappears) |

❖ Timing & it's significance & Causes:

| 🕮 late inspiratory: | 🕮 Early (or mid) inspiratory crepitations: | |
|---|---|---|
| ▪ LV failure<br>▪ TB , Pneumonia<br>▪ Diffuse fibrosing alveolitis (DFA) | ▪ Consolidation, Cavitation (lung abscess)<br>▪ Collapse & fibrosis, Bronchiectasis<br>▪ Secretions in large bronchus | ▪ Acute pulmonary edema<br>▪ TB (advanced) & pneumonia (resolving)<br>▪ Bronchiectasis & lung abscess |
| 🕮 Pan inspiratory : | 🕮 Inspiratory & expiratory | Never expiratory only |
| • DFA | ▪ Lung abscess & bronchiectasis | |
| | ❖ Pitch only for medium and coarse crepitations: | |

❖ Consonating: crepitations with metallic tone, indicates:

▪ Consolidation in surrounding alveoli e.g. Pneumonia, lung abscess & bronchiectasis

❖ Non-consonating: crepitations without metallic tone, indicates healthy surrounding alveoli e.g. Bronchitis

❖ Timing:

🕮 Expiratory: mild to moderate airway stenosis

🕮 Expiratory & inspiratory : indicates severe airway narrowing

🕮 Inspiratory: severe airway narrowing & secretions

❖ Causes:

a) Outside pressure e.g. LN & aneurysm

b) Wall lesion:
  - Edema (bronchitis)
  - Bronchospasm (bronchial asthma)
  - Tumor, fibrosis

c) Lumen occlusion: secretions, F.B.

## 4) Special test:

| A. Post- tussive suction | B. Succussion splash | C. Coin test |
|---|---|---|
| | | |
| ▪ هفضي ال cavity على الآخر باني اقول للعيان يكح وبعدين ياخد نفس يقوم الهوا يخش يملى ال cavity<br>▪ اسمع الشهقة اللي بعد الكحة | ▪ حط السماعة على ال chest<br>▪ هز العيان واسمع الطرطشة | ▪ مساعد يجيب عملتين على صدر العيان ويخبط بواحده على التانية والدكتور يسمع من ورا |
| ❖ **Heard over** | | |
| ▪ Collapsible cavity “lung abscess” | ▪ Hydropneumothorax | ▪ Pneumothorax & big emphysematous bullae |
| ❖ **Technique of auscultation** | | |
| ▪ Auscultate after prolonged cough a suction sound is heard | ▪ While vigorously shaking patient a sound of turbulent fluid is heard at upper level of fluid | ▪ Put coin on chest, at the same point on back put your stethoscope and strike the coin by another coin, now you listen to sound from back if you hear bell like sound it is due to pneumothorax. |

**D. Pneumothorax click:**

- ○ It is a rhythmical sound , synchronous with cardiac systole, due to left pneumothorax,
- ○ It is produced when there is air between the two layers of pleura overlying the heart

**E. Hamman sign:** Crushing sound due to pneumomediastinum

❖ **خلاصة ال Auscultation :**

1. اسمع بال diaphragm لأن معظم الدكاترة بيستخدموه وحطه firmly applied on skin
2. ابدا بال normal healthy side
3. اطلب من العيان يتنفس من بقه والنفس يكون عميق
4. امشي كالاآتي :
    - ○ Right side ⇔ left side
    - ○ Aspect ⇔ aspect
    - ○ Area ⇔ area
    - ○ space ⇔ space
5. اسمع ال intensity of breath sound
    - وحدد هيا عالية ولا قليلة
6. اسمع نوع ال breath sound و قبل ما تقول نوعه أتأكد بال vocal resonance :
    - خلي العيان : مرة يقول 44 44 بصوت عالي ومرة يقول 44 44 بصوت منخفق او بهمس
7. أحيانا ممكن تسمع ال additional sounds:
    - اطلب من العيان ياخد نفس جامد ويخرجه
    - اطلب من العيان يودى وشه الناحية التانيه ويكح كحتين وكمل سمع

### Chest Cases:

- COPD, Suppurative lung syndromes
- Fibrosis, Collapse, Pleural effusion

| COPD | Bronchiectasis | Lung abscess | TB cavity |
|---|---|---|---|
| **General exam** | | | |
| • Pulse : see before<br>• ± Signs of respiratory distress; see before<br>• ± if complicated by cor-pulmonale:<br>○ Signs of RVE only epigastric pulsation felt; see before<br>○ Signs of RVF; see before<br>• Puffiness of eyelid<br>• MILD Clubbing of fingers.<br>• MARKED clubbing if associated with bronchiectasis | • Recurrent fever<br>• Toxic face, loss of weight<br>• Puffiness of eyelid<br>• Toxic Clubbing of fingers | | ❖ SLS + TB<br>❖ TB toxemia at the onset: night fever, night sweat, loss of weight , loss of appetite<br>❖ Hemoptysis |
| | • Oedema of Lower limbs | | |
| | | ❖ Bad general condition | ❖ Relatively good general condition |
| **Clinically :** | | | |
| ▪ Evidence of bilaterality & hyperinflation & airway obstruction | ▪ In the basal part: signs of consolidation & may be fibrosis<br>▪ In the upper parts : normal or signs of chronic bronchitis & emphysema | ▪ Signs of chronic abscess : signs of cavity | ▪ Signs of cavity & fibrosis |
| **Inspection** | | | |
| **Shape & form** | | | |
| ▪ Symmetrical chest: Barrel shaped chest | • Basal parts: normal shape of chest<br>▪ Upper parts: barrel shaped | ▪ Normal | • Unilateral Retraction on the affected side due to fibrosis |
| **Movement: Chest expansion** | | | |
| ▪ Bilaterally limitation of movements | ▪ Bilaterally limitation of movements, mainly in the basal parts | ▪ Limitation of movements on the affected side | |
| **Palpation** | | | |
| **Trachea** | | | |
| ▪ Central | | | ▪ Shifted to same side due to fibrosis |
| **TVF** | | | |
| ▪ Decreased bilaterally all over the chest | • Basal parts: ↑<br>▪ Lower part: ↓ | ▪ ↑↑↑ | • Cavity site: ↑<br>• Fibrosis site: ↓ |
| • **Percussion** | | | |
| ▪ Hyper-resonance all over the chest & encroaching the normal cardiac & hepatic dullness<br>▪ Ptosed liver | • Basal parts: patchy dullness<br>▪ Upper parts: hyper-resonance | ▪ Dull on the affected area due to cavitation | ▪ Heterogenous dullness on the affected side |
| **Auscultation** | | | |
| **Breath sounds** | | | |
| • Early : vesicular breathing with prolonged expiration with *normal* intensity<br>• Late: vesicular breathing with prolonged expiration with *diminished* intensity | • Basal parts : patchy area of bronchial breathing<br>▪ Upper parts: vesicular breathing with prolonged expiration | ▪ Bronchial breathing | • Cavity site: Bronchial breathing<br>• Fibrosis site: Diminished intensity of breath sounds |
| **Vocal resonance** | | | |
| ▪ -ve whispering pectoriloquy | ▪ +ve whispering pectoriloquy in basal parts in areas of bronchial breathing | ▪ +ve whispering pectoriloquy | • Cavity site: +ve whispering pectoriloquy |
| ❖ Adventitious sound : Rhonchi :<br>○ Subtype: Polyphonic (sonorous + sibilant)<br>○ Area = site: generalized<br>○ Effect of cough: changeable but not disappear<br>○ Time: expiratory ± Inspiratory if secretion accumulated<br>❖ ± Crepitation : inspiratory due to secretions in recurrent chest infections | **Adventitious sound** | | |
| | ▪ Basal parts : medium sized or coarse Crepitations<br>▪ Upper parts: rhonchi | ❖ Inspiratory medium sized or coarse Crepitations | ❖ Cavity & fibrosis site:<br>▪ Inspiratory medium-sized crepitations Crepitations |

| ❖ Syndrome of multiple negatives (↓ Movement, ↓TVF, ↓ percussion note (dull), ↓ intensity of breath sounds) | | | |
|---|---|---|---|
| | **Pulmonary Fibrosis** | **Collapse** | **Pleural effusion** |
| ○ General exam | ○ Central cyanosis<br>○ Clubbing<br>○ Tachypnea<br>○ ± Cor-pulmonale: Edema of LL<br>○ ± respiratory failure : ± signs of respiratory distress | | • Congested neck vein<br>• Clubbing if empyema |
| ○ **Inspection**<br>○ Shape & form | ○ Unilateral Retraction on the affected side | ○ Unilateral Retraction on the affected side | ○ Unilateral Bulge in large effusion |
| ○ Movement: Chest expansion: Limited on the affected side | | | |
| ○ **Palpation**<br>○ Trachea | ○ Shift to same side | ○ Shift to same side | ○ Shift to opposite side |
| ○ TVF | ❀ TVF : ↓↓↓ | | |
| ○ **Percussion** | ❀ Dull on percussion | | |
| | ○ Heterogenous (patchy) dullness i.e. no certain topography غير منظمة | ○ Homogenous dullness i.e. have certain topography منظمة | ○ Basal Stony dullness |
| ○ **Auscultation:** | ❀ Breath sounds : Decreased intensity | | |
| ○ Adventitious sounds | ○ Crepitations (inspiratory)<br>○ ± rhonchi | | |
| ○ Vocal resonance: -ve whispering pectoriloquy | | | |

## ❖ NBs:

❖ **Types of fibrosis:**

I. **Pulmonary:**

A. **Parenchymatous (Unilateral): due to**

↳ TB, Bronchiectasis & Lung abscess

B. **Interstitial fibrosis (bilateral):** idiopathic pulmonary fibrosis (Hamman Rich syndrome)

II. **Pleuro-pulmonary fibrosis:** fibrothorax: it may complicate hemothorax or empyema

**N.B: how to deal with syndromic cases:**

| ❖ Pickwickian syndrome = Obesity hypoventilation syndrome: | ❖ Yellow nail syndrome: |
|---|---|
| ○ Obesity + COPD + Cor-pulmonale | ○ Bronchiectasis + yellow dystrophic nails + lymphedema + pleural effusion |

❖ **Varieties of COPD:**

| | A. Emphysema | B. Chronic obstructive bronchitis |
|---|---|---|
| ▪ Synonymous | Pink puffers = type A = emphysematous type | Blue bloaters = Type B = bronchitic type |
| ▪ The major abnormality | Impaired diffusion | Impaired ventilation |
| ▪ Leading to | Hypoxia & normocapnea | Hypoxia & hypercapnea |
| ▪ Dyspnea | Severe ( stimulation of respiratory center due to hypoxia) | Very mild (stimulation of respiratory center; unknown reason) |
| ▪ Sputum | Small volume | Large volume |
| ▪ Central cyanosis | Absent | Present |
| ▪ Pulmonary HTN | Very mild or absent | Present |
| ▪ Cor pulmonale & RVF | Very late or absent | Present |
| ▪ Chest examination | Hyperinflation; barrel shaped, hyper-resonance | Wheezes; vesicular breathing with prolonged expiration |
| ▪ Chest x-ray | Hyper-translucency | No hyper-translucency |
| ❖ ABG: | | |
| ▪ PO2 | Mild decrease | Severe decrease |
| ▪ PCO2 | Normal | high |
| ☠ However: there is usually overlap between both types because they frequently coexist, so it's difficult to differentiate them into 2 separate clinical types | | |

# Diagnosis Of Chest Case

| ❖ Etiological: | ❖ Anatomical: | ❖ Pathological | ❖ Functional: |
|---|---|---|---|
| 1) **Congenital:** infected cystic lung<br>2) **Traumatic:** pneumothorax<br>3) **Neoplastic:** bronchial carcinoma or adenoma<br>4) **Inflammatory or infectious:** pneumonia, COPD, TB, lung abscess.<br>5) **Others:**<br>○ Systemic diseases : SLE with pleurisy or interstitial fibrosis<br>○ Blood diseases : hemophilia or purpura with hemoptysis<br>○ Allergic : bronchial asthma | 1) Right or Left lung or bilateral<br>2) Front or back<br>3) Upper, middle, lower zones | 1) Consolidation: Pneumonia<br>2) Cavitation:<br>○ Lung abscess<br>○ TB cavity<br>3) Emphysema (+ chronic bronchitis)<br>4) Collapse<br>5) Fibrosis<br>6) Pleurisy<br>7) Pleural effusion<br>8) Pneumothorax<br>9) Hydropneumothorax | 1) **Compensation:**<br>▪ Compensated or<br>▪ Non compensated (respiratory failure suspected by central cyanosis)<br>2) **Complication:**<br>❖ cor pulmonale :<br>▪ RVE + failure<br>▪ Tender pulsating liver<br>▪ Pulmonary hypertension<br>▪ TR |

❖ E.g. :

- A case of COPD with bilateral emphysema , the patient is compensated but complicated with cor-pulmonale
- A case of left sided pulmonary fibrosis, mostly post tuberculous with right sided compensatory emphysema ,the patient is compensated not complicated
- A case of suppurative lung syndrome, mostly bronchiectasis, the patient is compensated but complicated with cor-pulmonale

# Summary Of Chest Examination

## ○ General examination:

| | | | |
|---|---|---|---|
| • Vital signs | • General overview | • Systemic overview | • Other systems except that of local exam |

## ○ Local examination : Chest examination

| I. Inspection | II. Palpation |
|---|---|
| 1. Shape & Symmetry | A. Tenderness |
| 2. Chest expansion | B. Chest expansion |
| 3. Chest wall abnormality; examine the front, sides & back of the chest | C. Subcostal angle |

4. Combined Inspection & Palpation: Respiratory Movement: Type, Rate, Rhythm & Depth
5. Combined Inspection & Palpation: Pulsations:
   - ○ Apical, pulmonary, left parasternal & epigastric pulsations
6. Combined Inspection & Palpation: Position of mediastinum: Apex & trachea

| | |
|---|---|
| 7. Signs of respiratory distress & failure:<br>○ Litten's Sign<br>○ Hoover's Sign<br>○ Campbell's Sign<br>○ Crico-Sternal distance<br>○ Working Ala nasi<br>○ Abnormal action of Accessory muscles<br>○ Co2 narcosis (hypercapnic encephalopathy): hypersomnia & drowsiness<br>○ Central Cyanosis<br>○ Clubbing<br>○ Flapping Tremors (asterixis)<br>○ Tachypnea, Tachycardia | D. Tactile vocal fremitus (TVF)<br>E. Palpable adventitious sounds<br>1) Anteriorly:<br>○ Supramammary, Mammary, Inframammary<br>2) Laterally:<br>○ Upper axillary, Lower axillary<br>3) Posteriorly :<br>○ Suprascapular, Interscapular, Infrascapular<br>• لو كان السؤال Palpation of the chest only إبدأ بالحاجات المشتركة ما بين ال inspection & palpation |

### III. Percussion

1) Hepatic dullness (see cardiology) & Heart percussion (see cardiology)
2) Chest wall:

A. Lung proper : Light percussion, except back by heavy percussion

| | | |
|---|---|---|
| ❖ Anteriorly mainly in MCL, by light percussion:<br>○ Clavicle<br>○ Infraclavicular region:<br>○ Space by space:<br>▪ 2nd → 6th at MCLExcept left 4th & 5th spaces at AAL | ❖ Laterally mainly in MAL, by light percussion in 4th space → 7th space | ❖ Posteriorly by heavy percussion:<br>○ Suprascapular (Trapezius): above spine of scapula<br>○ Interscapular: in paravertebral line From 2nd to 10th space<br>○ Infrascapular: in scapular line From 7th (scapular angle) → 10th space |

B. Special areas:

a) Bare area of the heart: see cardiology
b) Kronig's Isthmus by light percussion from dullness to resonance
c) Traub's area by light percussion: from center to the borders

3) Special test: shifting dullness.

### IV. Auscultation

1. Breath sounds:
   - ○ Intensity : normal, loud, diminished
   - ○ Type : Vesicular breathing , Vesicular breathing with prolonged expiration , Bronchial breathing & Broncho-vesicular breathing
2. Conducted sounds: Vocal resonance (Bronchophony, Whispering pectoriloquy, Aagophony)
   - ○ Confirm bronchial breathing
3. Adventitious sounds: Pleural rub, Crepitations & Wheezes
   - ○ Comment on SACT: Subtype, Area (site), relation to Cough, Timing
4. Special test: Post- tussive suction, Succession splash & Coin test.

# SCHEME OF CHEST

I. **History:** see the algorithm of chest history for diagnosis

II. **General examination:**

- **Clubbing :** عدم وجودها لا ينفي SLS
- **Oedema :** cor-pulmonale

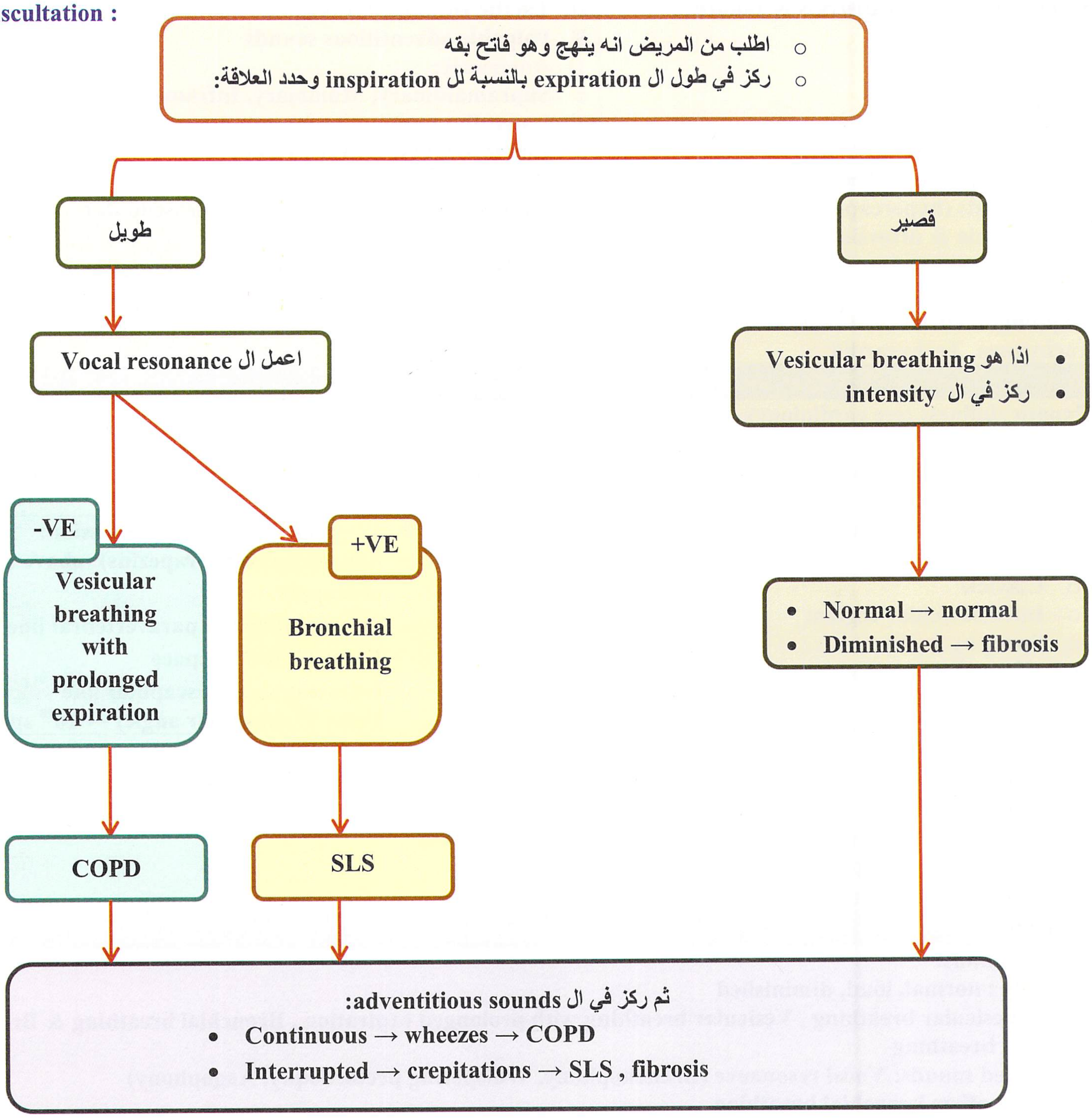
III. **local examination:**

1) **Chest expansion :**

مفتاح ال chest علشان تعرف المنطقة المصابة

| ❖ Abnormally : limitation of movement detect the diseased side | |
|---|---|
| ▪ Bilateral limitation | ▪ Unilateral limitation |
| ▪ In bilateral chest disease e.g. Emphysema, bronchiectasis | ▪ On the affected side e.g. Fibrosis, collapse. |

2) **Auscultation :**


○ اطلب من المريض انه ينهج وهو فاتح بقه
○ ركز في طول ال expiration بالنسبة لل inspiration وحدد العلاقة:
طويل
قصير
اعمل ال Vocal resonance
• اذا هو Vesicular breathing
• ركز في ال intensity
-VE
Vesicular breathing with prolonged expiration
+VE
Bronchial breathing
• Normal → normal
• Diminished → fibrosis
COPD
SLS
ثم ركز في ال adventitious sounds:
• Continuous → wheezes → COPD
• Interrupted → crepitations → SLS , fibrosis

3) **Inspection , palpation , percussion :** ظبطهم مع التشخيص

# INVESTIGATIONS OF A CHEST CASE

## I. Non-Imaging:

**❖ Investigation of choice:**

- COPD & fibrosis → respiratory function tests
- Bronchiectasis → high resolution CT
- Lung abscess → CT & bronchoscope
- Pleural effusion → X-ray followed by aspiration
- Cor-pulmonale →ECG
- Respiratory failure → ABG

1) **ECG** for cor-pulmonale
2) **Sputum analysis :**

A. **Macroscopic picture**
(chemical & physical properties)

B. **Mircoscpic picture (cells)**

C. **Culture & sensitivity**

❖ Indications of Sputum analysis:

- SLS
- May be indicated in COPD (as organism is usually known; pneumococci , haemophilus influenzae) but strongly indicated when there is failure of empirical treatment & suspected bronchiectasis

3) **Sweat analysis** in cystic fibrosis
4) **Skin for :**
   - Bronchial asthma; skin test to identify the allergen in extrinsic asthma
   - TB, tuberculin test
5) **Serous fluid Analysis** in pleural effusion to know the nature of fluid (transudate & exudate) & causative organism
6) **Arterial blood gases (ABG):**

❖ According to ABG there are two types of respiratory failure :

- **Type I : hypoxia** with normocapnea or hypocapnea
- **Type II : hypoxia** & hypercapnea

COPD: type II respiratory failure

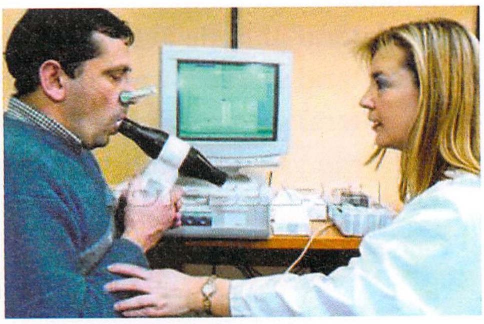
| | Normal | Respiratory failure |
|---|---|---|
| PO2 | 80-100 mmHg | < 60 mm Hg |
| PCO2 | 35 – 45 mmHg | > 50 mmHg |
| PH | 7.35 – 7.45 | ↓ in type II |

7) **Respiratory function tests** (RFTs) by spirometry:

- **Forced vital capacity (FVC):** it is the volume of an air maximally expired after maximum inspiration, normally : 5 liter
- **Forced expiratory volume in the first second (FEV1):** it is the volume of an air maximally expired after maximum inspiration in the 1st second, normally : 4 liter
- **Forced expiratory ratio (FER)** = FEV1/FVC X 100 = normally; 80 %
- **Residual volume (RV):** it's volume of air remaining in the lung after maximum expiration, normally: 1.2 liter
- **Total lung capacity (TLC):** it is the volume of air that lung contain when they are fully expanded, normally 6 liter

❖ **Abnormality in RFTs:**

| | Obstructive hypoventilation | Restrictive hypoventilation |
|---|---|---|
| Disease | COPD, BA | Fibrosis |
| RV | ↑ | Normal |
| Lung compliance | ↑ | ↓ |
| TLC | ↑ | ↓ |
| FER | ↓ | Normal or ↓ |
| FVC | ↓ | ↓ |



8) **Bronchoscope :**

| ❖ Diagnostic : | ❖ Therapeutic : |
|---|---|
| ○ Localize the site of lung abscess | ○ Drain pus & inject antibiotics into cavity |
| ○ Detect foreign body | ○ Remove foreign body |
| ○ Detect & guide biopsy of underlying malignancy | ○ Inject cytotoxic drugs |

9) **Bedside tests to assess the respiratory function:**

A. **Forced expiratory time :** using stethoscope over trachea & calculate the time of forced expiration , Normally 3 - 4 sec.

B. **Candle test or Match test :** normal person can turn off a candle at 15 cm distant while his lips are widely opened

C. **Holding breath test:** normally 10-20 sec.

D. **Tape test for chest expansion :** see before

E. **Manifestation of respiratory failure:** see before.

## II. Imaging:

1) **Plain X-ray** for all chest diseases (AP & lateral view) especially pleural effusion
2) **Bronchography** (contrast X-ray): it WAS the investigation of choice for bronchiectasis
3) **CT & MRI:**

- CT is the investigation of choice in lung abscess
- High resolution CT: is the investigation of choice in Bronchiectasis

4) **Ventilation / perfusion (V/Q) scanning :** to detect suspected pulmonary embolism

→ For more details about imaging, ECG, Clinical pathology , see Paraclinical Made easy for the author.

## CLINICAL DISCUSSION

❖ **What is the difference between Littin's sign & Litten's sign ?**

- ➢ Littin's sign: see before in the signs of respiratory distress (see before)
- ➢ To understand the Litten's signs , we should discuss first the Litten's phenomenon:

### Litten's Phenomenon:

- Normally a rippling shadow moving down the lower intercostal space is seen following diaphragmatic descent during deep inspiration. This is visible only in very thin individuals with a bright light applied obliquely to the chest wall ( this shouldn't be mistaken with normal inspiratory retractions of lower intercostal space; Littin's sign)

### Litten's sign:

- **Definition :** unilateral loss of litten's phenomenon i.e. unilateral loss of rippling shadow (compared to the other side)
- **Mechanism :** unilateral interference of normal diaphragmatic descent
- **Causes :**

- Unilateral phrenic nerve palsy e.g. diaphragmatic paralysis (diaphragmatic)
- Unilateral severe lower lobar disease (supra- diaphragmatic)
- Unilateral severe subphrenic disease (infra- diaphragmatic)

❖ **How can you differentiate between crepitations & pleural rub ?**

| | Crepitations | Pleural rub |
|---|---|---|
| Firm pressure by stethoscope | No change | ↑↑↑ |
| Effect of cough | May be affected | Never affected |
| Time | Mainly inspiratory | Inspiratory & expiratory |
| Site | Profuse | Localized |

? **How to know site of shifted trachea by auscultation** عند الطلب والسؤال عليها فقط?

- الطبيعي تسمع bronchial breathing لما نحط السماعة على ال sternomastoids
- حط السماعة على ال 2 sternomastoid ولاحظ علو الصوت فين .
- ال trachea تبقى shifted للناحية اللي الصوت فيها أعلى

### ❖ What are the differences between bronchiectasis and bronchiectasis sicca ?

| | Bronchiectasis | Bronchiectasis "sicca hemorrhagica" |
|---|---|---|
| ▪ Cause | Any infection causing weakness of bronchial wall | Secondary to TB |
| ▪ Site | Basal | Apical |
| ▪ Sputum | Excessive expectoration | Dry = sicca = no sputum |
| ▪ Blood in sputum | Blood tinged sputum | Frank hemoptysis = hemorrhagica |
| ▪ Prognosis | Good prognosis | Bad prognosis |

### ❖ How to differentiate between pulmonary and pleural causes as a cause of dullness over the base of left lung?

- By percussion over Traube's area

| | |
|---|---|
| ▪ Pleural origin : dull Traube's area | ▪ Pulmonary origin : resonant Traube's area |

### ❖ What are the differences between wheezes & rhonchi ?

| Wheezes | Rhonchi |
|---|---|
| Symptom | Sign |
| High pitched | Low pitched |
| Heard at the periphery | Heard in the center |
| Not palpable | Palpable |

### ❖ Which have the higher possibility of risk, generalized rhonchi or localized rhonchi ?

- Localized rhonchi because it may be tumor

### ❖ How to suspect tumor lesion from auscultation ?

➥ Hearing rhonchi with the following characters :

| | | |
|---|---|---|
| ▪ Monophonic (tumour obstruct one bronchus) | ▪ Localized | ▪ Fixed with cough |

### ❖ How to differentiate between dyspnea due to heart disease & chest disease ?

| Cardiac dyspnea | Respiratory dyspnea |
|---|---|
| ❖ Time | |
| ○ Nocturnal (PND; 1-2 hours after sleep) and associated with orthopnea | ○ Early in the morning |
| ❖ Associated symptoms | |
| ○ Palpitation, syncope, angina pain , hypertension | ○ Fever, sweating , wheezes |
| ❖ Examination | |
| ○ Chest: generalized wheezes, bilateral basal crepitations | ○ Chest : generalized wheezes |
| ○ Heart: gallop & murmur | ○ Heart: normal |

### ❖ Why are bronchial asthmatic rhonchi peripheral mainly while that of chronic bronchitis is central mainly?

- Because bronchial stenosis due to bronchial asthma is based on bronchospasm which needs smooth muscles which lie more in the peripheral bronchi
- While bronchial stenosis of chronic bronchitis is based on mucosal edema, hypertrophy & mucosal hypersecretion which needs bronchial mucosa which lie more in the central bronchi

### ❖ How to suspect diaphragmatic paralysis by examination?

1) Reversed tidal percussion
2) Litten's sign
3) Absent littin's sign
4) Abdominal paradox : abdominal retraction during inspiration
5) Thoracic respiration
6) Shifting of apical pulsation upwards
7) Right lung base dullness
8) Abdominal alternans: in diapgramtic *paresis* (not paralysis), periods of normal abdominal movement alternating with absent abdominal movement

☠ N.B: However definitive diagnosis by paradoxical movement in fluoroscopy (x-ray + fluorescent screen → moving images of the internal structures)

### ❖ What are the complications of COPD ?

- Respiratory failure
- Right sided heart failure following cor-pulmonale
- Left sided heart failure
- Pulmonary infections
- Pneumothorax
- Bronchiectasis
- Polycythemia
- Salt & water retention
- Complication of chronic cough

### ❖ What are the causes of left ventricular failure in COPD?

- **Associated disease of the left side** of the heart especially coronary artery disease
- **Reversed Bernheim** effect
- **Acidosis** leading to myocardial depression
- **Hypoxia** leading to myocardial ischemia
- **Volume overload** due to hyperdynamic circulation due to vasodilatation
- **Increased blood viscosity** due to polycythemia

### ❖ What is the value of sputum examination in chest case?

1. **Amount** /24h : big (> 1 cup/day) in suppurative lung syndrome
2. **Postural variation:**
   - Lung abscess: ↑ by lying on healthy side
   - Bronchiectasis : ↑ by stooping (leaning) forward
3. **Colour :**
   - White : chronic bronchitis
   - Green: pyocyaneous , anaerobic infection
   - Yellow : pyogenic infection
   - Black: cigarettes smokers, industrial cities
4. **Character** : mnemonic; **FOR WOMAN**
   - **Frothy** : acute pulmonary edema
   - **Red current jelly** : bronchial Carcinoma, Friedlander's pneumonia
   - **Rusty** : altered blood in pneumonia
   - **Watery** : hydatid cyst, alveolar cell carcinoma
   - **Mucoid (tenacious) or mucus pellet**: chronic bronchitis & bronchial asthma
   - **Mucopurulent or purulent** : bronchitis, bronchiectasis, SLS
   - **Anchovy sauce** "Chocolate" : amebic lung abscess
   - **Nammular** "coin like" : caseous material in TB
5. **Diurnal variation:**
   - Nocturnal: heart
   - Early morning : bronchiectasis & bronchial asthma
6. **Seasonal variation :**
   - Bronchiectasis : winter exacerbation

7. **Odour :** what are the causes of Fetid sputum ?
   - Foul fetid : suppurative lung syndrome & infection by anaerobes , spirochetes, fusiform bacilli & fungi

### ❖ What is the differential diagnosis of dullness in 2nd left space ?

1) **Chest wall:** e.g. Tumor
2) **Pleura:** apical pleural thickening, massive pleural effusion
3) **Left lung :**
   - Consolidation of left upper lobe, specially due to TB
   - Collapse of left upper lobe
   - Fibrosis of left upper lobe
   - Pancoast tumor
4) **Heart:**
   - Pulmonary artery dilatation, pericardial effusion
5) **Superior mediastinum :** thymus, thyroid & dermoid cyst
6) **Abdomen :** ascites & pregnancy - these will raise diaphragm & subsequently heart

### ❖ What are the main causes of cough ? (: ... الإجابة بالترتيب

| | | |
|---|---|---|
| 1. Chronic bronchitis, The most common cause | 2. Suppurative lung syndromes | 3. TB |
| 4. Bronchogenic carcinoma | 5. Chronic sinusitis (post nasal discharge) | |

### ❖ What are the complications of cough?

| A. Thoracic complications : | | | |
|---|---|---|---|
| ▪ Intercostal myalgia (muscle pain)<br>▪ Rib fracture (stress fracture) | ▪ Spontaneous pneumothorax | ▪ Hemoptysis | ▪ Emphysema<br>▪ Chronic bronchitis |
| B. Extrathoracic complications: | | | |
| ▪ Abdominal : hernia , stress incontinence , rectal or uterine prolapse | | ▪ Head : cerebral hemorrhage & subconjunctival hemorrhage | |
| C. General : insomnia | | | |

### ❖ What are the causes of acute dyspnea?

| | | | |
|---|---|---|---|
| • Acute massive myocardial infarction | • Acute massive lung collapse | • Acute pulmonary embolism | • Tension pneumothorax |
| • Pneumonia , pleurisy | • Bronchial asthma | • Hysterical | |

### ❖ What are the causes of paroxysmal dyspnea?

| ❖ Paroxysmal dyspnea with wheezing | ❖ Paroxysmal dyspnea without wheezing |
|---|---|
| • Bronchial asthma<br>• Cardiac asthma<br>• Uremic asthma<br>• Carcinoid syndrome<br>• Pulmonary vasculitis | • Cardiac dyspnea<br>• Extrinsic allergic alveolitis<br>• Tetany (laryngismus stridulus)<br>• Myasthenic crisis<br>• Recurrent pulmonary emboli |

### ❖ What are the causes of dyspnea at rest ?

| | | |
|---|---|---|
| • Severe degree of exertional dyspnea | • Postural dyspne | • Paroxysmal dyspnea |
| • Acute dyspnea | • Psychogenic dyspnea | |

### ❖ What are the causes of cor pulmonale ?

| A. Acute cor pulmonale : | B. Subacute cor pulmonale: | C. Chronic cor pulmonale : |
|---|---|---|
| • Massive pulmonary embolism<br>• Tension pneumothorax<br>• Massive lung collapse | • Lymphangitis carcinomatosis<br>• Recurrent showers of pulmonary emboli | • **Hypoxic cor pulmonale:** occurs in almost cases of chronic lung diseases e.g. COPD & interstitial lung disease<br>• **Vascular cor pulmonale :** primary pulmonary hypertension & pulmonary bilharziasis |

### ❖ What are the pulmonary causes of chest pain ?

| A. Respiratory | B. Mediastinal | C. Chest wall |
|---|---|---|
| • **Acute pleurisy** : primary or secondary to lung disease (pneumonia): stitching, referred to abdominal wall (T6-T11) shoulder (C3, C4), arm (C8- T1 in apical pleurisy)<br>• **Pleural effusion** : dull aching pain<br>• **Pneumothorax:** acute tearing chest pain,<br>• **Acute massive lung collapse**<br>• **Pulmonary infarction** : acute pain + hemoptysis + dyspnea<br>• **Lung diseases extending to pleura** | • **Mediastinal tumors**<br>• **Esophageal** : spasm reflux esophagitis, cancer | • **Skin :** infection, tumor<br>• **Breast :** mastitis, abscess, tumor<br>• **Ribs :** fracture, osteomyelitis<br>• **Intercostal muscles :** muscle strain, myositis<br>• **Intercostal N.:** root pain, Herpes Zoster |

### ❖ What are the types of hemoptysis?

| A. True : | B. Spurious (false): |
|---|---|
| ▪ Blood originating from below vocal cords | ▪ Blood originating from above vocal cords |
| Laryngoscope ← إزاي تفرق ما بين النوعين ؟ | |
| ▪ Blood is intermingled with sputum | ▪ Blood is on surface of sputum |
| ❖ **Causes :**<br>○ **Frothy blood tinged :** acute pulmonary oedema<br>○ **Blood stained (blood + sputum) البلغم فيه نقط دم:** acute bronchitis (the most common cause) & bronchogenic carcinoma<br>○ **Blood streaked (blood streaks + sputum) البلغم معرق بدم:** pulmonary TB, chronic bronchitis , bronchogenic carcinoma<br>○ **Frank blood دم صافي:** pulmonary TB, bronchial adenoma & carcinoma, bronchiectasis & lung abscess & pulmonary infarction , Mitral stenosis<br>○ **Red current jelly (blood + mucous + lung debris):** bronchial carcinoma<br>○ **Rusty: red brown sputum (altered blood pigment):** lobar pneumonia | ❖ **Causes :**<br>○ **Bleeding gums** (scurvy)<br>○ **Nasopharynx** (inflammation, tumors, ulcers) |

### ❖ What is the treatment of bronchial asthma ?

| ❖ Between attacks : | ❖ During attacks: |
|---|---|
| • Avoid irritating agent | • O2 therapy |
| • Oral corticosteroids | • Bronchodilators (aminophylline (IV), salbutomal (inhaler) |
| • Mast cell stabilizers (intal, ketofen) | • Mucolytic |
| | • Antibiotics |

## O.S.C.E QUESTIONS

| | |
|---|---|
| • Inspect, palpate, percuss & auscultate chest | • Percuss special areas of the chest |
| • Detect signs of hyperinflation by inspection, palpation & percussion | • Signs of COPD in the face |
| • Examine the lower lobes of the lung | • Examine the middle lobe of the lung |
| • Examine the apices of both lower lung lobes | |
| • General examination related to the chest | |

# FREQUENTLY ASKED QUESTIONS FOR MID & END ROUND EXAM

**Test yourself!**

| | |
|---|---|
| 1) What is the surface anatomy of right lung? | 2) What is the surface anatomy of left lung? |
| 3) What is the surface anatomy of oblique fissure? | 4) What is the interscapular region formed of? |
| 5) Examine lower lobes equal what? | 6) What are chest causes of jaundice? |
| 7) What are chest causes of cyanosis? | 8) What are chest causes of clubbing? |
| 9) What are chest causes of pallor ? | 10) What are the causes of edema LL? |
| 11) What is the importance of pulse examination in a chest case? | 12) What are the causes of suppurative lung syndrome? |
| 13) Describe Barrel chest? | 14) What is the causes of barrel cheat? |
| 15) What are the causes of symmetrical chest shape? | 16) How to differentiate normal from abnormal hemithorax (bulge & retraction) clinically? |
| 17) What are the causes of unilateral chest bulge | 18) What are the causes of abdominal respiratory movement? |
| 19) What are the causes of thoracic respiratory movement ? | 20) What is the normal respiratory rate? |
| 21) What are causes of bradypnea? | 22) What are the causes of rapid deep breathing? |
| 23) What are the causes of rapid shallow breathing? | 24) What are accessory muscles of inspiration? |
| 25) What is the aim of pursing lips? | 26) What is Litten's sign? |
| 27) Importance of examination of cardiac pulsation in chest patient? | 28) Causes of shifted trachea? |
| 29) Causes of tender chest wall? | 30) Causes of increased TVF? |
| 31) Causes of decreased TVF? | 32) Causes of palpable rhonchi? |
| 33) Causes of limited chest expansion? | 34) Trail's sign? |
| 35) Cause of dullness on long? | 36) Cause of stony dullness on lung? |
| 37) | 38) Surface anatomy of Krong's isthmus? |
| 39) Causes of dullness on Kronig's isthmus? | 40) Borders & Surface anatomy of Traub's area? |
| 41) Content of Traub's area? | 42) Note of percussion of normal Traub's area? |
| 43) Physiological causes of dullness on Traub's area? | 44) How to differentiate between pulmonary and pleural causes as a cause of dullness over the base of left lung? |
| 45) How to diagnose hydropneumothorax by percussion? | 46) Causes of diminished intensity of breath sounds? |
| 47) Describe normal vesicular breathing? | 48) Describe characters of vesicular breathing with prolonged expiration? |
| 49) Causes of vesicular breathing with prolonged expiration? | 50) Describe bronchial breathing? |
| 51) Causes of bronchial breathing? | 52) What is the classification of bronchial breathing? |
| 53) What is the significance of the pitch of rhonchi? | 54) What is the significance of the timing of rhonchi? |
| 55) What is the significance of the distribution of rhonchi? | 56) What is the significance of the cough on rhonchi? |
| 57) What are causes of fine (or late inspiratory) crepitations ? | 58) What are causes of coarse or early inspiratory crepitations? |
| 59) What are the causes of pleural rub? | 60) D'Espin sign? |
| 61) What are special tests in chest auscultation ? | 62) What is meant by vocal resonance? |
| 63) What are the investigations of chest case? | 64) What are the manifestation of respiratory failure? |
| 65) What are the causes of Cor-pulmonale? | 66) What are the manifestation of cor-pulmonale? |
| 67) What is treatment of bronchial asthma ? | 68) What are the complications of COPD? |
| 69) Why are bronchial asthmatic rhonchi peripheral mainly while that of chronic bronchitis is central mainly? | 70) How to differentiate between hemoptysis & hematemesis? |
| 71) Definition & causes of tracheal tug? | 72) Pulmonary function test? |
| 73) Define emphysema? | 74) Succussion splash ? |
| 75) Coin test? | 76) Causes of acute chest pain ? |
| 77) All questions answered in the clinical discussion are very important. | |

# Chronic Obstructive pulmonary Disease (COPD)

- **Personal history**
- **Complaint:** Shortness of breath 3 days duration.
- **HPI:**

- The condition started 50 years ago by paroxysmal attacks of **cough**, **dyspnea** and **wheeze** of gradual onset and progressive course. These attacks were precipitated by exertion and dust exposure, relieved by rest and medications. The patient was completely free in between attacks.
- 20 years later, **dyspnea** progressively increased till became at rest with no orthopnea or PND and **wheeze** became more continuous even in between attacks and the patient developed **productive cough**. The sputum was **small** in amount, less than one cup per day, **whitish** in colour, **mucoid** in character, **odourless**, increased in the **morning** with **no relation to certain posture.**
- The patient sought medical advice, investigated by CXR and sputum analysis, treated by inhaler and mucolytics and was advised to stop smoking.
- The patient remained symptoms-free till 3 days ago when he experienced another similar attack of **dyspnea** at rest, **cough** with mucoid whitish odourless **sputum** and continuous **wheeze**.
- No Symptoms of **systemic congestion**,
- No **cyanosis**,
- No **haemoptysis**,
- No **Chest pain**,
- No **Constitutional Symptoms**,
- No Symptoms suggesting **other system** affection.

**Past history**

- No History of Drug intake.
- No History of DM, HPN, T.B.
- No History of admission to chest sanatorium.
- No history of operations.

**Family history**

- No consanguinity.
- No similar condition in family.
- No common disease in family.

## 1. General examination:

- The patient is fully **conscious**, well oriented for time, place and person. Average mood and memory. The patient is co-operative with average intelligence.
- **Temperature:** 37° c.
- **Bl. Pressure:** 150/60.
- **Resp. Rate**: 16/minute, regular, average depth, abdomino-thoracic.
- **Pulse:** Regular, 60 beat/minute, **big pulse volume**, **water hammer pulse**, equal on both sides, intact peripheral pulsation, vessel wall is not felt.
- **The patient** looks well, average built, **no cyanosis**, pallor or jaundice. He is lying free flat comfortable in bed.
- **Head & Neck:** puffy eyelids, arcus senilis, nicotine stain on his lips with no sub-conjunctival hemorrhage, no working ala nasi or pursing of lips. Neck veins are pulsating **not congested**.
- **Upper limb:** fine tremors (probably senile or due to β stimulant but **no flapping tremors**), **No clubbing**.
- **Lower Limb:** mild bilateral pitting painless **edema** reaching mid leg level.

## 2. Local Examination:

### a) Inspection

- **Chest Wall**: some brownish pigmentation, with no scars, no dilated veins.
- **Resp. Movement**:
  - Rate: 16/minute, regular, average depth, abdomino-thoracic.
  - Expansion: bilateral limitation in chest expansion.
  - Signs of action of accessory Muscles of respiration: there is suction of supraclavicular fossa, inspiratory indrawing of lower intercostals spaces with no visible contraction of sternomastoid or elevation of thoracic cage (Signs of action of accessory muscles of inspiration). The patient is not pursing his lips or grasping a chair (Signs of action of accessory muscles of expiration). No hoover's sign or tracheal tug (Signs of low flat diaphragm).
- **Shape of the chest**: symmetrical, Barrel shaped chest. (↑ AP diameter = Tr. Diameter, raised shoulder, obtuse subcostal angle).
- **Mediastinum**: **Central trachea**, No trail's sign, No tracheal Tug with **Absent Apex**.
- **Pulsations**: Apex is not visible. There is visible epigastric pulsations(probably aortic).

### b) Palpation:

- **Bilateral limitation** in chest **expansion**.
- **Central Trachea** with **decreased tracheal length** but **no tracheal tug**.
- **Absent Apex** but there is **epigastric pulsations** (Probably Aortic in origin → HDC).
- **TVF**: equal on both sides.
- No **palpable Rhonci** or rub.
- No chest wall **tenderness**.

### c) Percussion:

- **Hepatic dullness** at **Rt. 6th Space MCL** with **normal hepatic span** (=14cm) indicating **encroachment on hepatic dullness**.
- **Heart**: No dullness to the right border of sternum, both aortic and pulmonary areas are resonant, preserved waist of the heart, no dullness outside the apex, lower end of the sternum is impaired note with **resonant bare area of the heart** (cardiac dullness is encroached upon by hyper-inflated lung).
- **Lung**: generalized hyper-resonance with encroachment on hepatic and cardiac dullness:

- **Front**: Resonant clavicles, infra-clavicular areas, dullness is detected at 7th space Rt. and Lt. MCL.
- **Lateral**: Dullness at 9th space Rt. And Lt. MAL.
- **Back**: Dullness at 11th space Rt. And Lt. SL.
- Resonant **Bare area**, Resonant **Kronig's** isthmus.
- By **Tidal Percussion** → Diaphragm is freely mobile.
- No **Shifting dullness**.

### d) Auscultation:

- Diminished vesicular breath sound with prolonged expiration and diminished V.R. Associated with generalized polyphonic expiratory and inspiratory rhonci changeable with cough.

## 3. Other systems examination:

- Ptosed liver with no tenderness.

? **What is your diagnosis ?**

**A Case of COPD mostly Allergic (chronic Asthamtic bronchitis), The patient is compensated not complicated .**

? **Why COPD :**

Combination of:

| **Bilateral Disease** | **Signs of hyperinflation** | **Obstruction** |
|---|---|---|
| Bilateral limitation | Barrel-Shaped Chest | Prolonged Expiration |
| Central Trachea | Absent Apex | Wheeze |
| Equal TVF | Hyper-resonance | ↓ V.R |
| Symmetrical chest | Ptosed Liver | |
| | Resonant bare area | |

? **Why Allergic, why chronic bronchitis ??**

- **History of asthmatic attacks ( with dyspnea ) on exposure to allergens ( asthma ).**
- **History of heavy smoking ( chronic bronchitis ).**

? **Why compensated/not Complicated ??** → No Cor Pulmonale or Respiratory Failure.

▸ **No Cor Pulmonale ::**

- From History: No systemic congestion.
- Examination: No neck veins, LL edema (Can be explained due to $co_2$ retention or use of steroids), No tender hepatomegaly, No signs of Rt. V. hypertrophy.

▸ **No Respiratory Failure::**

- **History**: No cyanosis.
- **Clinically**: No tremors, cyanosis or disturbed consciousness.
- **Lab.** : ABG (The most important as RF is a lab. Diagnosis).

? **How would you proceed to manage this case?**

▸ **Investigation**

For etiology: CBC, ↑ IgE, Skin tests.

For Functional Diagnosis: ABG, ECG, CXR, ECHO

For main diagnosis: Sputum analysis, CXR, Pulmonary Function Test (Of Choice).

▸ **Treatment**

- Avoid Exposure to irritation.
- TTT of pulmonary infections.
- Symptomatic ttt: expectorant, mucolytic, bronchodilator, steroids.
- TTT of complications: Resp. failure & Heart failure, polycythemia, bullae.

### Cor-pulmonale

❖ **Differences from COPD in:**

**1- From History : Symptoms of systemic congestion.**

**2- Examination :**

- **Congested neck veins with expiratory filling, Bilateral pitting L.L edema & Enlarged tender liver in abdominal exam.**

→ **Otherwise, It's the same.**

# Fibrosis

- **Personal history**
- **Complaint:** Shortness of breath 1 month duration.
- **HPI:**

- In a known diabetic patient, The condition started 15 years ago by acute onset, progressive course of **night fever, night sweat** which was associated with dry **cough** with no special character, no postural, seasonal or diurnal variation. 4 days later, he experienced stitching right sided **chest pain** which was localized, increased with cough and inspiration, relieved by rest, holding breath, lying on Rt. Side, not related to exertion. It was associated with gradual onset and progressive course of **dyspnea at rest** with no orthopnea or PND. The patient was admitted to Ain-Shams University Hospital, investigated by CXR, pleural fluid analysis and was diagnosed as massive pleural effusion. He was treated by antibiotics, aspiration of 1.5 liters of turbid yellowish fluid with no complications.
- The patient remained symptoms-free for one and half month, then he re-experienced similar attack of **dry cough, dyspnea** at rest and right sided localized stitching **chest pain**. The patient was re-admitted to Ain-Shams University Hospital, re-investigated by CXR, CBC, Tuberculin test which was positive. The patient was treated by aspiration of yellowish turbid fluid and he received medications in the form of tablets, capsules and injections. He was advised to follow this regimen for one year and he completed the course of treatment.
- The patient remained quite well till one month ago when he developed gradual onset, progressive course of **dyspnea** on less than ordinary effort, relieved by rest with no orthopnea, no PND.
- No Symptoms of **systemic congestion**.
- No **cyanosis**, No **haemoptysis**.
- No **pressure** symptoms.
- No nocturnal diarrhea, no palpitation, no unsteadiness with sudden standing, no gustatory sweating, no impotence **(symptoms of autonomic neuropathy)**

- **Past history**
  - Past history of D.M. since he was 10 years, manifested by polyuria, polydipsia, polyphagia, investigated by fasting blood sugar, and treated with insulin for life.
  - No History of Drug intake.
  - No History of HPN.
  - No history of operations.
- **Family history**
  - No consanguinity.
  - No similar condition in family.
  - No common disease in family.

## 1. General exam

- The patient is fully **conscious**, well oriented for time, place and person. Average mood and memory. The patient is co-operative with average intelligence.
- **Temperature:** 37.2° c.
- **Bl. Pressure:** 130/80 (in both standing and recumbent position).
- **Resp. Rate**: 16/minute, regular, average depth, abdomino-thoracic.
- **Pulse:** Regular, 60 beat/minute, average volume, no special character, equal on both sides, intact peripheral pulsation, vessel wall is not felt, no radio-femoral delay
- **The patient** looks well, average built, **no cyanosis**, pallor or jaundice. He is lying free flat comfortable in bed.
- **Head & Neck:** nicotine stain on his lips with no sub-conjunctival hemorrhage, no working ala nasi or pursing of lips. Neck veins are pulsating **not congested**.
- **Upper limb:** No flapping tremors, **No clubbing**.
- **Lower Limb:** No L.L. **edema,** with some scars (traumatic), some trophic changes, diabetic dermopathy.

## 2. Local Examination:

### A. Inspection:

- **Chest Wall**: No scars, no dilated veins, no pigmentation.
- **Resp. Movement**:
  - Rate: 16/minute, regular, average depth, abdomino-thoracic.
  - Expansion: Limitation in chest expansion on the Rt. Side.
  - Signs of action of accessory Muscles of respiration: No suction of supraclavicular fossa, no inspiratory indrawing of lower intercostal spaces with no visible contraction of sternomastoid or elevation of thoracic cage (No working accessory muscles of inspiration). The patient is not pursing his lips or grasping a chair (Signs of action of accessory muscles of expiration). No hoover's sign or tracheal tug (Signs of low flat diaphragm).
- **Shape of the chest**: asymmetrical, Retraction on Rt. Side, acute subcostal angle.
- **Mediastinum**: shifted **trachea** to the Rt. side (trail's sign), No tracheal Tug, **the Apex** is in Lt. 5 space MCL.
- **Pulsations**: There is visible epigastric pulsations(probably aortic).

### B. Palpation:

- **Limitation** in chest **expansion** on Rt. Side.
- **Central Trachea** with **decreased tracheal length** but **no tracheal tug**.
- **Apex** is in the left 5th space MCL & **epigastric pulsations** (Probably Aortic in origin).
- **TVF**: increased on Rt. Side especially at apical parts!!!! (*it is supposed it is decreased but may be attributed in this case to tracheal shift to the right side).*
- No **palpable Rhonci** or rub.
- No chest wall **tenderness**.

### C. Percussion:

- **Hepatic dullness** at **Rt. 5th Space MCL.**
- **Heart**: impaired note to the right border of sternum, both aortic and pulmonary areas are resonant, preserved waist of the heart, no dullness outside the apex, lower end of the sternum is impaired note.
- **Lung**:
  - **Front**: Resonant clavicles, infra-clavicular areas, Heterogeneous dullness is detected from 3rd space downwards in Rt. MCL.
  - **Lateral**: Heterogeneous dullness at 4th space downwards in Rt. MAL.
  - **Back**: Heterogeneous dullness at Rt. SL.
  - **Bare area**: impaired note, Resonant **Kronig's** isthmus.
  - By **Tidal Percussion** → Diaphragm is freely mobile.
  - No **Shifting dullness**.

### D. Auscultation:

- Normal breath sound on Lt. side, diminished air entry on Rt. Side with decreased V.R with pan inspiratory fine crepitations not changed with cough at Rt. Infra-mammary area.

## 3. Other system examination:

See neurology for Diabetic Peripheral neuropathy (P.N) *(All signs of diabetic peripheral neuropathy are present in this case )*

? **What is your diagnosis ?**

- **A Case of Right Sided pleuro-pulmonary fibrosis secondary to T.B. The patient is compensated, complicated with cor pulmonale.**

? **Why Fibrosis ??**

On the Rt. Side there is::

1.↓ Expansion by inspection.
2.↓ TVF by palpation.
3.↓ Resonance by percussion.
4.↓ Breath sound by auscultation.

So, It's a syndrome of multiple negatives either:

○ **Pleural Effusion** (excluded by retraction and mediastinal shift to Rt.)
○ **Collapse** } **D.D by percussion** → Homogenous
○ **Fibrosis** } → Heterogeneous

? **Why Rt. sided ?** from History (site of pain & aspiration) and examination.

? **Why Secondary to T.B ?** from History (T.B toxemia) and from Tuberculin test.

? **Why compensated/not Complicated ?** → No Cor Pulmonale or Respiratory Failure.

▸ **No Cor Pulmonale ::**

- From History: No systemic congestion.
- Examination: No neck veins, L.L edema, No tender hepatomegaly, No signs of Rt. V. hypertrophy.

▸ **No R.F ::**

- **History**: No cyanosis.
- **Clinically**: No flappy tremors ,no cyanosis or disturbed consciousness.
- **Lab.** : ABG (The most important as RF is a lab. Diagnosis).

? **What are the causes of upper zone lung fibrosis?**

- **TB**
- **Allergic bronchopulmonary aspergillosis**
- **Ankylosing spondylitis**
- **Asbestosis**

? **How would you proceed to manage this case?**

❖ **Investigation**

- For etiology: Tuberculin test, CBC, ESR.
- For Functional Diagnosis: ABG, ECG, CXR, ECHO
- For main diagnosis: Pleural fluid analysis, CXR, Biopsy, Pulmonary Function Test.

❖ **Treatment**

○ Control of diabetes and treatment of peripheral neuropathy(*see neuro)*
○ Treatment of T.B (if still active).
○ Supportive ttt for fibrosis

# TB cavity versus Lung abscess

- **Personal history…**
- **Complaint :** Shortness of breath of one day duration.
- **HPI:**

- The condition started 15 years ago by gradual onset and progressive course of **productive cough,** the sputum was **small** in amount, **thick, whitish, odorless** and **not related to posture**. One week later, he experienced **night fever, night sweat, loss of appetite and loss of weight**. He was admitted to El-Abbasia Chest Hospital, investigated by CXR, tuberculin test, sputum analysis and culture and diagnosed as **pulmonary T.B**. He received anti-tuberculous treatment for 2month at hospital and was advised to continue this regimen for 7 more months at home but, unfortunately, he discontinued the treatment after one month.
- One month after he stopped anti T.B treatment, he developed **productive cough** of **yellowish, fetid** sputum, **1.5 cup in amount, increased by sleeping on the right side** and in **the early morning** associated with **exertional dyspnea** on ordinary effort (i.e on climbing the 2nd floor) not associated with orthopnea or PND associated with **continuous wheeze**. He was re-admitted to El-Abbasia Chest Hospital, investigated by CXR, tuberculin test, sputum analysis and culture, treated by mucolytic, expectorants and inhaler and was advised to stop smoking.
- The patient was quite well till one day ago when he developed gradual onset and progressive course of exertional **dyspnea** on less than ordinary effort with no orthopnea or PND.
- No Symptoms of **systemic congestion**.
- No **cyanosis**, No **haemoptysis**.
- No **Chest pain**.
- No **Pressure symptoms**.
- No **Constitutional Symptoms**.
- No Symptoms suggesting **other system** affection.

**Past history:**

- No History of DM, HPN.
- No History of admission to chest sanatorium.
- No history of drugs or operations.

**Family history:**

- No consanguinity.
- No similar condition in family.
- No common disease in family

1. **General examination :**
    - The patient is fully **conscious**, well oriented for time, place and person. Average mood and memory. The patient is co-operative with average intelligence.
    - **Temperature:** 37° c.
    - **Bl. Pressure:** 120/70.
    - **Resp. Rate**: 16/minute, regular, average depth, abdomino-thoracic.
    - **Pulse:** Regular, 60 beat/minute, average volume, no special character, equal on both sides, intact peripheral pulsation, vessel wall is not felt.
    - **The patient** looks well, average built, **no cyanosis**, pallor or jaundice. He is lying free flat comfortable in bed.
    - **Head & Neck:** no puffiness in eyelids, no sub-conjunctival hemorrhage, no working ala nasi or pursing of lips. Neck veins are pulsating **not congested**.
    - **Upper limb:** No **clubbing**, no **flapping tremors**.
    - **Lower Limb:** no L.L **edema.**

## 2. Local examination:

### A. Inspection:

- **Chest Wall**: no scars, no dilated veins, no pigmentation.
- **Resp. Movement**:

- Rate: 16/minute, regular, average depth, abdomino-thoracic.
- Expansion: limitation in chest expansion on Lt. side.
- Signs of action of accessory Muscles of respiration: there is no suction of supraclavicular fossa, no inspiratory indrawing of lower intercostals spaces with no visible contraction of sternomastoid or elevation of thoracic cage (Signs of action of accessory muscles of inspiration). The patient is not pursing his lips or grasping a chair (Signs of action of accessory muscles of expiration). No hoover's sign or tracheal tug (Signs of low flat diaphragm).

- **Shape of the chest**: retraction on the lt. side with normal form.
- **Mediastinum**: Central trachea i.e No trail's sign, No tracheal Tug with visible apical pulsation.
- **Pulsation**: visible apical and epigastric pulsation (Normal findings).

### B. Palpation:

- **Limitation** in chest **expansion** on Lt. side.
- **Central Trachea** (*may be shifted in these cases*) with **no tracheal tug**.
- **Apex**: Regular, 70/min., in the left 5th space MCL, localized, normal character, no thrill and no rocking movement.
- **TVF**: increased in the Lt. supra-mammary area and decreased in the Lt. infra-mammary area.
- No **palpable Rhonci** or rub.
- No chest wall **tenderness**.

### C. Percussion:

- **Hepatic dullness** at Rt. 5th Space MCL.
- **Heart:** No dullness to the right border of sternum, aortic area is resonant with mild dullness in pulmonary area, dullness in left 3rd space (waist), dullness outside the apex, lower end of the sternum is dull *(fibrosis*), with dull bare area.
- **Lung:** dullness in the lower part of Lt. lung.
    - **Front:** Resonant clavicles, infra-clavicular areas, slight dullness is detected in left 2nd, 3rd and 4th (AXL) spaces with stony dullness in left 5th (AXL) and 6th at MCL.
    - **Lateral:** Dullness in the left 7th and 8th spaces at MAL.
    - **Back:** Dullness in left 9th and 10th at SL.
    - Dull **Bare area**, Resonant **Kronig's isthmus**.
    - By **Tidal Percussion** → Diaphragm is freely mobile.
    - No **Shifting dullness**.

### D. Auscultation :

- **Bronchial breathing** with +ve V.R. in **left supra-mammary** with **diminished air entry** in the **Lt. infra-mammary** areas (Vesicular breath sound with prolonged expiration with diminished vocal resonance and expiratory polyphonic rhonchi can be auscultated on the right side as there is underlying chronic bronchitis as he is chronic heavy smoker).

## 3. Other systems examination…

? **What is your diagnosis ?**

**A Case of Left sided tuberculous apical cavity with basal fibrosis, The patient is compensated not complicated.**

? **Why did you diagnose your case as cavity ??**

**Combination of these signs in left supra-mammary area**

| **Inspection** | **Palpation** | **Auscultation** |
|---|---|---|
| Decrease expansion | Increased TVF | Bronchial breath |

? **Why did you diagnose your case as TB cavity not a lung abscess ??**

**It is TB because:**

**By history:**

- **There is history suggestive of TB toxemia at the onset: night fever …… etc…**
- **There is history of hemoptysis which is so common in TB.**
- **There is history of admission to a TB sanatorium.**
- **There is history of receiving drugs for long period ( anti-TB drugs ).**

**By examination: (signs of fibrosis + signs of cavitation)**

→ **There are clinical signs more apparent in the upper lung field (left supramammary) in the form of cavitation & fibrosis on the left side by:**

→ ***By inspection:***

- **Shape: There is retraction on the left hemithorax.**
- **Movement: There is diminished movements on the left hemithorax.**

→ ***By palpation:***

- **Trachea: There is shift of the trachea to the left side ( same side of the lesion ).**
- **TVF: There is increased TVF in the upper lung field supramammary region (cavity) & decreased TVF in the lower lung field ( excessive fibrosis ).**

→ ***By percussion:***

- **Note: There is heterogenous dullness on the left side.**

→ ***By Auscultation :***

- **Breath sound:**

1. **Bronchial with bronchophony & whispering pect. in the upper lung field supramammary region (cavity).**
2. **Diminished intensity in the lower lung field ( excessive fibrosis ).**

- **Additional sounds: Inspiratory medium-sized crepitations in the left side ( cavity & fibrosis ).**

? **Why compensated/ not Complicated ??** → No Cor Pulmonale or R.F

▸ **No Cor Pulmonale ::**

- From history : no systemic congestion
- Examination: No congested neck veins, no L.L edema, no tender hepatomegaly (in abdominal exam).

▸ **No R.F ::**

- **History**: No cyanosis.
- **Clinically**: No tremors, cyanosis or disturbed consciousness.
- **Lab.** : ABG.(the most important as RF is a lab. Diagnosis).

? **How would you proceed to manage this case?**

➢ **Investigation**

- ○ **For etiology**: for T.B i.e tuberculin test, ESR, CBC "for activity of T.B"
- ○ **For Functional Diagnosis**: ABG, ECG
- ○ **For main diagnosis**: CXR, CT, bronchoscope, Pulmonary Function Test (to evaluate for possibility of surgical interference).

➢ **Treatment**

- ○ **Medical**: anti T.B (only if there is evidence of activity), symptomatic ttt.
- ○ **Surgical**: Resection (in failure of medical ttt or severe recurrent hemoptysis and it must be localized with fair pulmonary functions, otherwise surgery will be contraindicated).

? **What organisms tend to cause lung cavitation?**

- **Staphylococcus aureus**
- **Klebsiella pneumonia**
- **Mycobacterium tuberculosis**

? **What is important to examine in the eyes of this patient ?**

🕮 **Jaundice, because some anti-TB drugs are hepato-toxic as INH, Rifampicin and Pyrazinamide.**

? **What is the effect of INH on the liver?**

🕮 **Hepato-toxic causing Chronic active hepatitis & Cirrhosis.**

? **Why would you like to look in the conjunctiva & face?**

🕮 **To look for pallor which might be present in patients with pulmonary TB.**

? **What other chest diseases may present with pallor ?**

- ○ **Other infective chest diseases as: pneumonia, lung abscess.**
- ○ **Pulmonary embolism.**

? **Would you expect to find pallor in this patient ?**

🕮 **No, because:**

1. **TB is old and not active now.**
2. **There is evidence of chronic asthmatic bronchitis.**

? **Why don't you expect to find pallor in chronic asthmatic bronchitis ?**

- ○ **Because in such case, there is usually secondary polycythemia due to the presence of chronic hypoxia which will stimulate the release of Erythropoietin to induce polycythemia.**
- ○ **OR: in severe cases of hypoxia, there will be cyanosis.**

? **What is important to examine in the neck of this patient ?**

- ○ **Cervical LN for: TB lymphadenopathy for the possibility of recurrence.**
- ○ **Trachea for: position.**
- ○ **Neck veins for: congestion in case of development of RVF.**

? **What investigations do you think were done to the patient when the doctors suspected TB ??**

- ○ **Enumerate the investigations of pulmonary TB.**

? **What do you think Tuberculin test will be in this patient now ?**

- ○ **Positive because he got TB before ( old TB ).**

? **What makes Tuberculin test positive ?**

- **Infection with TB ( whether active or old ).**
- **Vaccination with BCG .**

? **What do you expect to find in the CXR of this patient on the left side ?**

- **Heterogenous opacity with reticulations.**
- **The mediastinum moves towards the fibrosis ( tracheal shift ).**
- **The diaphragm moves towards the fibrosis ( tenting of the diaphragm ).**

# Bronchiectasis

- **Personal history…**
- **Complaint :** Shortness of breath 3 days duration.
- **HPI:**

- The condition started 20 years ago by gradual onset and progressive course of **productive cough**. The sputum is **excessive** in amount, **2 cups** per day, **purulent** in character, **greenish** in colour, increased by **leaning forwards**. The patient couldn't detect its odour due to **associated sinusitis**. The patient sought medical advice, investigated by chest x-ray, sputum analysis and tuberculin test which was negative, treated by antibiotics, bronchodilator and expectorant and the condition improved.
- Nine years later, When the patient was 17 years old, he worked as a **welder** and the condition became worse. One year after working as a welder, the patient suffered from gradual onset and progressive course of **exertional dyspnea**. The patient experienced dyspnea on climbing 1st floor with no orthopnea or PND associated with **continuous wheeze**. The patient sought medical advice and admitted in Kasr El-Ainy Hospital, investigated by chest x-ray, sputum analysis and CT chest and treated by inhaler and mucolytics and was advised to stop working as a welder.
- The patient was quite well till 3 days ago when he re-experienced **exertional dyspnea** on climbing 1st floor with no orthopnea on PND.
- **No symptoms suggesting malabsorption, DM, intestinal obstruction and no history of jaundice** (Ask for manifestations of cystic fibrosis).
- No **Haemoptysis**.
- No **pressure** symptoms.
- No **chest pain**, **cyanosis** or **systemic congestion**.
- No Symptoms suggesting **other system** affection.

**Past history:**

- No History of T.B.
- No History of DM, HPN.
- No History of admission to chest sanatorium.
- No history of drugs or operations.

**Family history:**

- There is similar condition in his family (He has a brother with the same manifestations).
- No consanguinity.
- No common disease in family.

1. **General examination :**

- The patient is fully **conscious**, well oriented for time, place and person. Average mood and memory. The patient is co-operative with average intelligence.
- **Temperature:** 37° c.
- **Bl. Pressure:** 130/80.
- **Resp. Rate**: 16/minute, regular, average depth, abdomino-thoracic.
- **Pulse:** Regular, 60 beat/minute, average volume, no special character, equal on both sides, intact peripheral pulsation, vessel wall is not felt.
- **The patient** looks well, average built, **no cyanosis**, pallor or jaundice. He is lying free flat comfortable in bed.
- **Head & Neck:** no puffiness in eyelids, no sub-conjunctival hemorrhage, no working ala nasi or pursing of lips. **Neck veins** are pulsating **not congested**.
- **Upper limb:** generalized **toxic clubbing** passing from parrot peak to drum stick.
- **Lower Limb:** no L.L **edema.**

## 2. Local examination:

### A. Inspection:

- **Chest Wall**: no scars, no dilated veins, no pigmentation.
- **Resp. Movement**:
  - Rate: 16/minute, regular, average depth, abdomino-thoracic.
  - Expansion: bilateral limitation in chest expansion.
  - Signs of action of accessory Muscles of respiration: there is suction of supraclavicular fossa, inspiratory indrawing of lower intercostals spaces with no visible contraction of sternomastoid or elevation of thoracic cage (Signs of action of accessory muscles of inspiration). The patient is not pursing his lips or grasping a chair (Signs of action of accessory muscles of expiration). No hoover's sign or tracheal tug (Signs of low flat diaphragm).
- **Shape of the chest**: symmetrical, Barrel shaped chest. (AP diameter ≥ Tr. Diameter, raised shoulder, obtuse subcostal angle).
- **Mediastinum**: **Central trachea**, No trail's sign, No tracheal Tug with **Absent Apex**.
- **Pulsations**: Apex is not visible. There is visible epigastric pulsations(probably aortic).

### B. Palpation:

- **Bilateral limitation** in chest **expansion**.
- **Central Trachea** with **decreased tracheal length** but **no tracheal tug**.
- **Absent Apex**.
- **TVF**: equal on both sides.
- No **palpable Rhonci** or rub.
- No chest wall **tenderness**.

### C. Percussion:

- **Hepatic dullness** at **Rt. 6th Space MCL** with **normal hepatic span** (=14cm) indicating **encroachment on hepatic dullness**.
- **Heart**: No dullness to the right border of sternum, both aortic and pulmonary areas are resonant, preserved waist of the heart, no dullness outside the apex, lower end of the sternum is impaired note with **resonant bare area of the heart** (cardiac dullness is encroached upon by hyper-inflated lung).
- **Lung**: generalized hyper-resonance with encroachment on hepatic and cardiac dullness:
  - **Front**: Resonant clavicles, infra-clavicular areas, dullness is detected at 7th space Rt. and Lt. MCL (You may find basal dullness in these cases).
  - **Lateral**: Dullness at 9th space Rt. And Lt. MAL (You may find basal dullness in these cases).
  - **Back**: Dullness at 11th space Rt. And Lt. SL (You may find basal dullness in these cases).
  - Resonant **Bare area**, Resonant **Kronig's** isthmus.
  - By **Tidal Percussion** → Diaphragm is freely mobile.
  - No **Shifting dullness**.

### D. Auscultation :

- Diminished vesicular breath sound with prolonged expiration and diminished V.R. Associated with bilateral diffuse inspiratory coarse consonating **crepitations** changeable with cough. (Scattered expiratory polyphonic rhonchi, specially in upper lung zones, can be auscultated and patchy bronchial breath or areas of diminished air entry can be auscultated in these cases).

## 3. Other systems examination…

- Ptosed liver with no tenderness.

### ? What is your diagnosis?

- **A Case suppurative lung syndrome most probably congenital bronchiectasis associated with sinusitis with signs of hyperinflation in upper lung zones, The patient is compensated not complicated.**

### ? Why Bronchiectasis ??

Combination of

| **History** | **General exam** | **Local exam** |
|---|---|---|
| SLS | toxic clubbing | crepitations |

### ? Why congenital ?

- From history :: Onset at 8 years old, associated sinusitis (immotile cilia syndrome) and +ve family history.

### ? Why compensated/ not Complicated ? → No Cor Pulmonale or R.F

▸ **No Cor Pulmonale ::**

- From history: No systemic congestion.
- Examination: No congested neck veins, no L.L edema, no tender hepatomegaly (in abdominal exam).

▸ **No R.F ::**

- **History**: No cyanosis.
- **Clinically**: No tremors, cyanosis or disturbed consciousness.
- **Lab.** : ABG. (The most important as RF is a lab. Diagnosis).

### ? How would you proceed to manage this case?

→ **Investigation**

- **For etiology**: Na in sweat, detection of gene defect (CFTR), measuring cilia motility (nasal biopsy) & (investigations for malabsorption, D.M, intestinal obstruction, obstructive jaundice "**cystic fibrosis**" should be asked in this patient).
- **For Functional Diagnosis**: ABG, ECG.
- **For main diagnosis**: Sputum analysis, CXR, bronchogram, CT with high resolution, bronchoscopy, Pulmonary Function Tests (for associated COPD and to evaluate for possibility of surgical interference).

→ **Treatment**

- **Medical**: antibiotics, mucolytics, expectorant, bronchodilator.
- **Drainage**: Postural (Best), bronchoscope, external.
- **Surgical**: Lobectomy, segmentectomy (in failure of medical ttt or severe recurrent hemoptysis and it must be localized with fair pulmonary functions, otherwise, surgery is contraindicated).

### ? What are the causes of thoracotomy scar?

- **Lung malignancy**
- **Bronchiectasis associated with uncontrolled or recurrent hemoptysis**
- **Tuberculosis (common in the past)**

**? What is the most important investigation for this patient ?**

- CT chest: *( the most important investigation )*
  - It provides excellent visualization of the bronchiectatic airways.
  - It localizes the site & extent of bronchiectasis before surgery.

**? What are the other causes of coarse crepitations ?**

- Acute pulmonary oedema, lung abscess, late stage of pneumonia (stage of resolution).

**? What are the other causes of bilateral basal crepitations ?**

- Fine bilateral basal crepitations in case of LVF ( pulmonary congestion ).

**? What is the DD of this case ?**

A. **Causes of suppurative syndrome;** which is defined as:

❖ Cough with expectoration of excessive purulent foeted sputum, usually related to posture :

1. **Lung abscess:**
   - Acute onset , no periodicity.
   - Expectoration increases on lying on the healthy side.
   - Signs are localized, & Chest X-ray reveals a *cavity*.
2. **Bronchiectasis:**
   - Gradual onset, periodicity ( *more in winter , more in the morning* ).
   - Expectoration increases on leaning forwards.
   - Signs are bilateral & basal, & Chest X-ray reveals *honey-combing*.
3. **Infected cystic lung:**
   - Signs of bronchiectasis since birth or in early childhood.
   - Chest X-ray reveals *soap-bubble appearance*.
4. **Empyema with broncho-pleural fistula:**
   - Signs of pyopneumothorax.

B. **Causes of hemoptysis.**

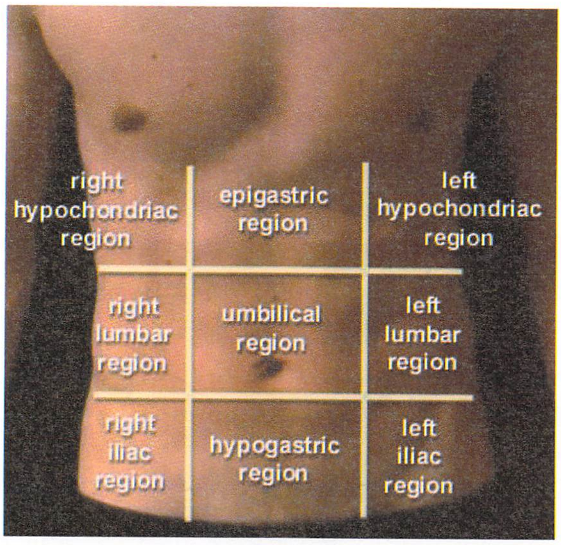
# Your Notes

# ABDOMEN

## ❖ Compartments of the abdomen :

☞ For purpose of description , the abdomen is divided by two descriptive systems into :

I. 9 areas by:


right hypochondriac region
epigastric region
left hypochondriac region
right lumbar region
umbilical region
left lumbar region
right iliac region
hypogastric region
left iliac region

↳ 2 Horizontal lines:

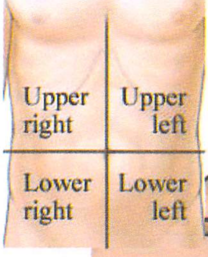
- Upper one :
  - → Transpyloric plane; midway between suprasternal notch & symphysis pubis (LI) OR
  - → Subcostal plane (L3): a transverse plane passing through the inferior limits of the costal margin
- Lower one :
  - → Supracristal plane: transverse plane passing through the summits of the iliac crests; (L4) OR
  - → Intertubercular plane: transverse plane passing through the iliac tubercles (L5)

↳ 2 Vertical lines :

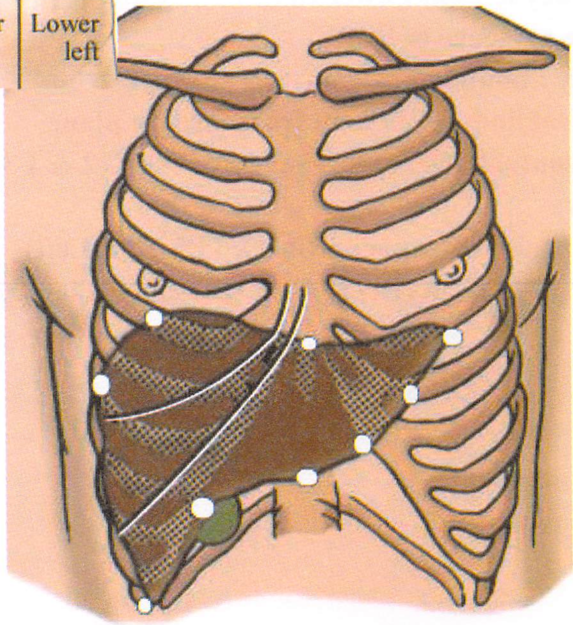
- Midclavicular line = {mid inguinal line (mid way between symphysis pubis & ASIS)}

II. 4 areas by :

- Vertical & horizontal line crossing umbilicus


Upper right
Upper left
Lower right
Lower left

## ❖ Surface anatomy of the liver:



⊛ **Site :** Right hypochondrium & epigastric regions

⊛ **Upper border : a line connecting :**

- Apex of the heart i.e. left MCL 5th intercostal space
- A point at the xiphisternum
- 5th rib in the right MCL
- 7th rib in the right MAL
- 9th rib in the right scapular line

⊛ **Lateral border :**

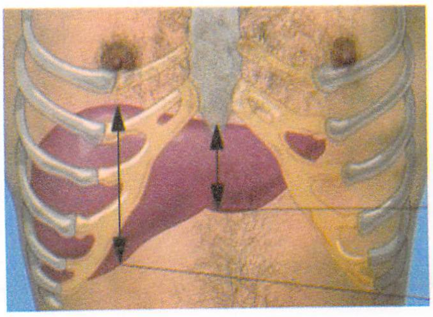
- From 7th to 11th rib in right mid axillary line

⊛ **Lower border: a line connecting :**

- Tip of right 9th costal cartilage
- Midway between xiphisternum & umbilicus
- Tip of left 8th costal cartilage
- 6th rib in left Mid Clavicular Line

⊛ **Normal liver span :**

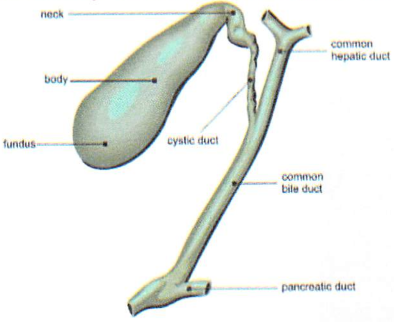
- Distance between upper & lower border of liver
- Middle line : 4-8 cm
- Right Mid Clavicular Line: 8-16 cm

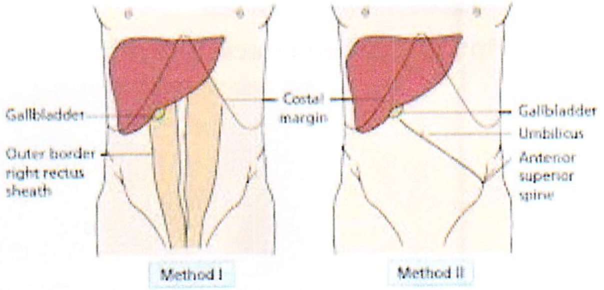


## ❖ Surface anatomy of the gall bladder :

↳ **Normal gall bladder has a fundus, body & neck.**

↳ **Surface anatomy of the fundus gall bladder by 2 methods:**

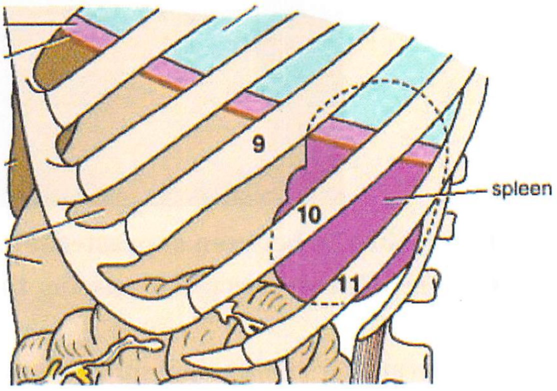

neck
body
fundus
cystic duct
common hepatic duct
common bile duct
pancreatic duct


Gallbladder
Outer border right rectus sheath
Costal margin
Gallbladder
Umbilicus
Anterior superior spine
Method I
Method II

- ○ **At intersection of lateral border of rectus abdominis with right costal margin**
- ○ **Intersection of a line {Gray-Turner line} extending from left ASIS to umbilicus with right costal margin at tip of 9th costal cartilage**

## ❖ Surface anatomy of the spleen :

- **Site :** **Left hypochondrium**
- **Lies on the** **9, 10 & 11th ribs posteriorly with its long axis in line with 10th rib**
- **Laterally:** **doesn't exceed mid-axillary line**
- **Medially:** **scapular line**


9
10
11
spleen

## ❖ Surface anatomy of the kidney :

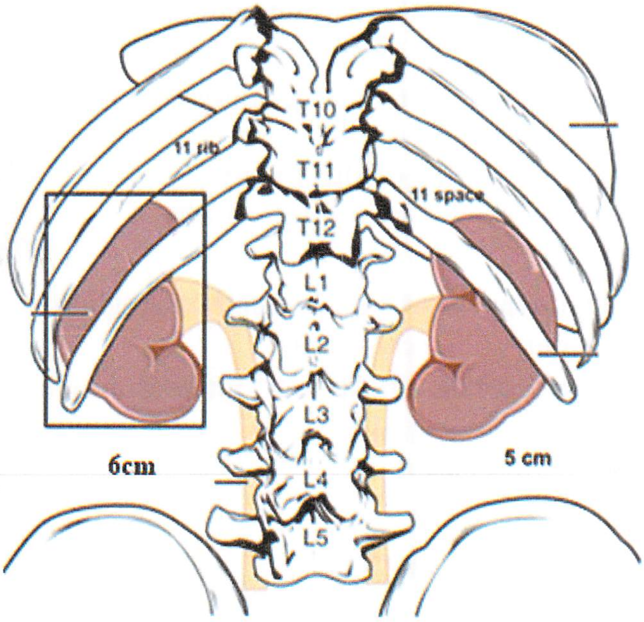
- **Right Kidney is 1 cm Lower than Left Kidney due to the presence of liver**

❖ **Posteriorly : bounded by Morris's parallelogram:**

- ○ **2 vertical lines :** **3 & 9 cm from median plane**
- ○ **2 horizontal lines :** **at level of spines of T12 & L3**

❖ **Anteriorly:**

- ○ **Upper end :** **11th space (Right), 11th Rib (Left)**
- ○ **Lower end :** **5 cm (Rt) & 6 cm (Lt) above iliac crest**


T10
T11
T12
L1
L2
L3
L4
L5
11 rib
11 space
6cm
5 cm

**Abdominal cases :**

1. **Bilharziasis: pure Bilharzial fibrosis**
2. **Hepatitis : Post hepatitic cirrhosis**
3. **Mixed Bilharziasis & Hepatitis cirrhosis**
4. **Malignancy**

# ABDOMINAL HISTORY

## A. Personal History

| | | |
|---|---|---|
| 1. **Name:** الإسم ثلاثي | 2. **Age:**<br>○ Young : hemolytic anemia<br>○ Old : cancer head of pancreas | 3. **Sex :**<br>○ Females : cholecystitis<br>○ Males : cancer head of pancreas |
| 4. **Occupation:**<br>○ Duodenal ulcer in stressful occupation<br>○ Bilharziasis is commoner in farmer | 5. **Marriage:** sterility in liver cirrhosis & Bilharziasis<br>6. **Menstrual history if female.** | 7. **Residence & address:** endemic area for Bilharziasis & parasitic infestation<br>• **History of travelling abroad** |
| 8. **Habits of medical importance:**<br>○ Cigarette smoking : for peptic ulcer<br>○ Alcohol : alcoholic liver cirrhosis<br>- Related to amount, duration e.g. 10L/day for 15 years | | 9. **Handedness.** |

## B. Complaint + duration: إي اللي جابك المستشفى ؟

❖ Common complaints :

| | | | |
|---|---|---|---|
| ▪ vomiting of blood | ▪ bloody stool | ▪ yellowish discoloration of skin & eye | ▪ Abdominal distention |
| ▪ Pain | ▪ diarrhea | ▪ constipation | ▪ Swelling |

## C. History of present illness = HPI المرض بدأ معاك إزاي , آخر مرة كنت كويس فيها إمتى ؟

| | |
|---|---|
| 1. Pain | 2. Swellings: Ascites , Abdominal mass, Lower limb edema, Lymph node |
| 3. Upper GIT symptoms | 4. Lower GIT symptoms |
| 5. Hepato-biliary "jaundice" | 6. Constitutional symptoms |
| 7. Genitourinary symptoms | 8. Uremic symptoms |
| 9. Investigations & treatment received | 10. Symptoms of other systems |

❖ N.B.:

| | |
|---|---|
| تتكتب في ال complaint بكلام العيان | ✎ |
| تتكتب في H/O of present illness عادي | الباقي |

Analysis of symptoms mentioned here is the specific data; to be added on the general analysis

## 1. Pain: عندك ألم في بطنك ؟

✍ **Pain:**

❖ **Analysis :**

○ **OCD, ↑, ↓, Associated symptoms**

○ **Character: الوجع ده شكله اي : e.g. colicky مغصي , throbbing نقح , burning حرقان , dull aching تقل, dragging طوبة او سحب, stitching شكشكة,… etc.**

○ **Site مكان الوجع ده فين**

○ **Radiation هل بيسمع في حته تاني**

○ **Relation to هل له علاقة ب (meal, respiration, exertion, postural):**

- **Gastric ulcer increases pain during eating**
- **Duodenal ulcer increases pain during fasting**

## 2. Swellings: AALL

❖ **Analysis :**

○ **OCD, ↑,↓, site, size, history of trauma, painful or not;**

→ **Swellings could be :**

**A. Abdominal masses ؟ في كلكوعة في بطنك e.g. Organomegaly**

✍ **Localized Swelling**

**B. Ascites ؟ بطنك ورمت أو نفخت :**

✍ **Abdominal distension**

- **History of tapping : amount, aspect (clear or turbid) , colour, complications e.g. fever, infection, wound leakage and encephalopathy & recurrence or not.**

**C. Lower limb edema ؟ رجلك ورمت أو نفخت**

✍ **Lower limb swelling:**

- **Value: liver cell failure , bilharzial cor-pulmonale & nephrotic syndrome : for Analysis (see cardiology)**

**D. Other swellings ؟ في أي كلاكيع تاني عندك e.g. Lymph node → continue lymphadenopathy sheet**

## 3. Upper GIT symptoms:

○ Appetite ؟ شهيتك على الأكل اتغيرت:
- Anorexia ؟ نفسك مسدودة
- Polyphagia ؟نفسك مفتوحة وبتاكل على طول

○ Nausea؟ نفسك غمة عليك

○ Vomiting ؟حصلك ترجيع , analysis:
- ▪ Spontaneous or induced
- ▪ Preceded by nausea or not
- ▪ Number of attacks
- ▪ Time of occurrence
- ▪ Odour & Content

○ Dysphagia (difficulty in swallowing) , analysis:
هل هناك صعوبة في البلع ؟ للسوائل ولا الأكل ؟
- ▪ OCD, ↑↓, Associated symptoms
- ▪ Complete (absolute) or partial
- ▪ To fluids (achalasia) or to solid (organic)
- ▪ Painful (odynophagia) or not

○ Dyspepsia ؟ الأكل "اللقمة" بتتعبك

○ Eructation ؟بتتكرع كتير

○ Water brush ؟ بتحس باللعاب مالي فمك

○ Hiccough ؟ بيجيلك زغطة كتير

○ Heartburn ؟ هل هناك حمو على فم المعدة

○ **Hematemesis** ؟ رجعت دم قبل كده

## 4. Lower GIT symptoms:

○ Flatulence ؟ بطنك انتفخت ؟ وفيه غازات عندك كتير

أخبار الطبيعة ايه :

○ **Diarrhea ؟ عندك اسهال, constipation؟ عندك امساك**

○ **Tenesmus ؟ هل فيه تعنية أو تقل مع البراز**

○ **Colour of stool: ؟ لون البراز عامل ازاي**

▪ **Melena**

هل هناك براز اسود زي الزفت وريحته وحشة ؟

✍ **Passage of soft black tarry offensive stool**

▪ **Hematochezia : bleeding per rectum**

?هل في دم احمر مع البراز

✍ **Bloody stool**

➪ **Hematemesis, (portal hypertension), analysis :**

✍ **Vomiting of blood:**

- **OCD, ↑, ↓, then analysis ABCD:**

**A. Attack : number, date, before the attack…, during the attack…, after the attack …,**

**B. Blood : amount, content, color**

**How can you differentiate between hemoptysis & hematemesis ?**

| | ❖ Hemoptysis | ❖ Hematemesis |
|---|---|---|
| ▪ Before attack: | Cough | Nausea, vomiting |
| ▪ During attack: | | |
| ○ Symptoms | Coughing blood | Vomiting blood |
| ○ Colour | Bright red blood | Dark; Coffee-ground (hematine) لون البن المحروق |
| ○ Content | Mixed with air (frothy) | Mixed with food |
| ○ Chemical reaction (pH) | Alkaline | Acidic |
| ▪ After attack | Blood tinged sputum for a while | Melena and constipation |
| ▪ Examination | Chest , CVS signs | GIT signs |

**C. Circulatory compensation : hospital admission, blood transfusion, treated by (tamponade خرطوم ببلون , endoscopic injection حقن بالمنظار , surgery عملية جراحية )**

**D. Dysfunction : Disturbed conscious level, bleeding from other orifices**

**... years ago, the patient had {number of attacks....} of Hematemesis of acute onset , {...} course, the attack was in {Date e.g. The fourth of April, nineteen ninety three. (Apr. 1993)} ...was preceded few days before by Nausea & vomiting of {Amount e.g. small or moderate or large amount} of blood, dark red in colour, containing food particles, {±} associated with loss of consciousness, then followed by melena for a ... days, the patient sought medical advice, he was admitted to ... hospital, investigated by ..., received treatment in the form of ....**

### 5. Hepato-biliary "jaundice" :

❖ **Jaundice; analysis :**

✍ **Yellowish discoloration of skin & eye**

1. **OCD**
2. **Anorexia, nausea, vomiting,**
3. **Bleeding tendency**
4. **Pruritus هل فيه هرش ؟**
5. **Pain ( in Right Hypochondrium)**
6. **Colour ( eye, urine, stool)**
   لون عينك بقى اصفر ؟
   ولون البول والبراز اتغير ؟
7. **Cachexia & Drugs use**
8. **Fever, Weight loss & Fatty dyspepsia**

### 6. Constitutional symptoms :

في ارتفاع في درجة الحرارة ؟ فيه صداع ؟ في فقدان للشهية ؟
في تعب وهمدان في جسمك ؟

1. **In LCF & malignancy & TB peritonitis ask about:**
   - **Fever, headache, anorexia , malaise, fatigue, sweating & loss of weight**
   - **Bleeding tendency**
2. **In splenomegaly ask about:**
   - **Other swellings e.g. Lymph node all over the body**
   - **Bony pains : in leukemia**
   - **Bleeding tendencies in skin & from orifices :**
     بتنزف من اسنانك او بتجيب دم من انفك ؟ .
     بتتطلعلك بقع في جسمك مع اي خبطة صغيرة ؟ في نزيف مع البول او البراز ؟

### 7. Genitourinary symptoms :

✌ **Genital : infertility خلفت قبل كده ؟**
- ○ **Male: impotence, libido (↑, ↓) الانتصاب الصباحي كويس ؟**
- ○ **Female: breast atrophy, & menstrual disturbance في لخبطة في الدورة ؟**

✌ **Urinary:**
في مشاكل في البول عندك ؟ كمية البول اتغيرت ؟
في دم في البول ؟ في ألم عند التبول؟ هل بتدخل الحمام كتير ؟
- ○ **Amount of urine**
- ○ **Pain , Passage of stones**
- ○ **Color (hematuria)**
- ○ **Dysuria , urgency, frequency (normal 5-6/day, 0-1/ night)**

### 8. Uremic symptoms

- ○ **Anorexia , nausea, vomiting**
- ○ **Bad odor of breath "halitosis" رائحة فمك متغيرة؟**
- ○ **HicCough**
- ○ **Disturbed Conscious Level (DCL), headache, lack of concentration**

### 9. Investigations & treatment received :

عملت فحوصات اي ؟ واخدت علاج اي?

- ○ **CBC, liver function tests, coagulation profile, abdominal ultrasonography, upper GIT endoscopy & liver biopsy**
- ○ **Treatment as Vitamin K supplementation, propranolol to decrease portal vein pressure, blood & plasma transfusion.**

### 10. Symptoms of other systems :

- ○ هل عندك مشاكل تانية في جسمك
  وتاخد كل سيستم وتسأل العيان على الأعراض الكبيرة اللي فيه بسرعة أوي

## D. Past history as usual but focus on the followings:

**A. Diseases:**

- ○ **Intestinal parasites :**
  → **Contact with water canals for Bilharziasis**
  ← جالك بلهارسيا قبل كده ؟ نزلت الترعة قبل كده وجالك دم في البول أو البراز؟ لو نعم كمل أسئلة
  ← الحكاية ديه من امتى ؟ اخدت علاج اي ؟ جرعته اد اي ؟ حللولك بعدها وقالولك خفيت ولا لأ ؟ نزلت الترعة بعد كده ؟
- ○ **Common disease : DM, TB & hypertension**
- ○ **Viral hepatitis : blood transfusion نقلت دم , infection سخنت وعينك اصفرت وبولك اغمق وروحت الحميات ؟**
- ○ **Fever : typhoid & brucellosis**

**B. Operations & blood transfusion : hepatitis especially HCV**

→ **History of recurrent blood transfusion ( not regular in cirrhosis , repeated regular in hemolytic anemia)**

**C. Drugs: hepatotoxic drugs : see later**

## E. Family history as usual & asked for familial polyposis & hemolytic anemia.

# DISCUSSION ON HISTORY

❖ **What are the types of abdominal pain?**

❁ **Types of Abdominal pain:**

| A. Visceral | B. Parietal "Somatic" | C. Referred |
|---|---|---|
| • Felt at the site of the primary stimulus.<br>• Vague, Not localized & difficult to describe<br>• Subtypes :<br>○ **Colic :** from hollow organs (obstruction)<br>○ **Dull ache :** from hollow or solid organ (distention) | • Irritation of the parietal peritoneum<br>• Sharp, localized & easier to describe | • Pain felt at a site other than stimulated but in area supplied by the same neural segment<br>• E.g.: cholecystitis → right shoulder |

❖ **What are the abdominal causes of chest pain ? = referred pain**

| | | | |
|---|---|---|---|
| Amebic liver Abscess | Subphrenic Abscess | Peritonitis | Hiatus hernia |
| Peptic ulcer | Cholecystitis | GORD | |

❖ **What are the non-alimentary (non-abdominal) causes of abdominal pain?**

| | | |
|---|---|---|
| ○ Cardiac : myocardial infarction | ○ Diabetic ketoacidosis | ○ Herpes zoster |
| ○ Chest : acute pleurisy & pneumonia | ○ Dissecting aortic aneurysm | ○ Torsion testis & ovary |
| ○ Cord compression (thoracic segment) | | |

❖ **What are the medical causes of acute abdominal pain?**

| | | |
|---|---|---|
| • Addisonian crisis | • Porphyria | • Severe hypercalcemia |
| • Hemolytic crisis | • Sickle cell anemia | • Cardiac : myocardial infarction |
| • Chest : acute pleurisy & pneumonia | • Diabetic ketoacidosis | • Systemic lupus erythematosus |
| • Rheumatic fever (non-infective peritonitis) | • Familial mediterranean fever | • Food poisoning & Uremia |

❖ **What are the types of splenic pain?**

| | | |
|---|---|---|
| • **Dull ache :** heaviness due to stretch of capsule | • **Dragging :** stretch of ligaments by weight of enlarged spleen | • **Throbbing :** abscess<br>• **Stabbing :** due to infarction<br>• **Stitching :** due to perisplenitis |

❖ **What is the definition of :**

| A. Anorexia | B. Polyphagia | C. Parorexia |
|---|---|---|
| ○ Loss of appetite | ○ Increased appetite | ○ Perverted appetite (Picca) |
| **What are the causes of :** | | |
| Anorexia? | Polyphagia with progressive loss of weight? | Pica? |
| • **Psychogenic :** anorexia nervosa & depression<br>• **GIT :** atrophic gastritis , cancer, viral hepatitis<br>• **Debilitating diseases** : TB, liver Failure, renal Failure, malignancy | ○ Mal-absorption syndrome<br>○ Parasitic infestations<br>○ Thyrotoxicosis<br>○ DM | ○ Ankylostoma Anemia<br>○ Pregnancy, Psychogenic<br>○ Ca deficiency |

❖ **What are the causes of Halitosis? ; Bad mouth odour :**

| | | |
|---|---|---|
| • Oral cavity : caries, pyorrhea, tonsillitis, sinusitis | • Esophagus : diverticulum & cancer | • Intestine : malabsorption, chronic intestinal obstruction |
| • Suppurative lung syndromes | • Liver cell failure "fetor hepaticus" | • Chronic renal failure "ammoniacal odour" |

❖ **What are the causes of Hiccough?**

- **Definition :** Abnormal spasmodic contraction of diaphragm due to irritation of phrenic nerve or diaphragm

- **Causes :**

- **Idiopathic :** commonest.
- **Renal failure** "uremia" : common known cause
- **Chest:** pericarditis, empyema & mediastinal syndrome
- **Diaphragm irritation** : subphrenic, liver or splenic abscess

❖ **What are the causes of jaundice after blood transfusion?**

- ○ Incompatible blood transfusion
- ○ Hepatitis
- ○ Liver cell failure

❖ **What is the color of blood in hematemesis ?**

- Dark red due to acid hematin which indicates gastric origin

❖ **Could it be bright red in colour ? yes, in the following conditions:**

- ○ Massive rapid severe bleeding
- ○ Esophageal varices
- ○ Achlorhydric stomach

❖ **What are the commonest causes of hematemesis ?**

- Peptic ulcer
- Esophageal varices
- Cancer stomach & drug erosion

❖ **What is the value of hematemesis ?**

- The patient is vascularly decompensated
- Change lines of treatment

❖ **What are the causes of loss of conciseness after hematemesis ?**

- ▪ Vasovagal shock
- ▪ Hypovolemia
- ▪ Hepatic encephalopathy

❖ **What is the difference between melena & hematochezia ?**

| | Melena | Bleeding per rectum (hematochezia) |
|---|---|---|
| • Definition : | ○ Passage of digested blood with stools | ○ Passage of fresh blood with stools |
| • Site of the lesion | ○ Hematemesis or melena usually indicate a gastrointestinal bleeding from a lesion above ileocecal valve :<br>A. Above ligament of Trietz : upper GIT causes ; esophagus , stomach & duodenum<br>B. Below the ligment of Trietz : lower GIT causes : jejunum & ileum | ○ Hematochezia usually indicates gastrointestinal bleeding below ileocecal valve i.e. lower gastrointestinal bleeding i.e. colon & anorectum |
| • N.B.: | • Right side colonic lesions are usually associated with melena or bleeding per rectum while left side colonic lesions are associated with bleeding per rectum | |
| • Amount | ○ Amount : > 50 – 100 ml blood if less than this it will be occult blood in stool | |
| • Duration | ○ > 8 hours; time needed for blood to be broken down within the intestinal lumen | ○ < 8 hours ; rapid transit time due to massive severe brisk bleeding |
| • Character | ○ Black tarry, glistening , soft offensive | ○ Bright red in color |
| • Differential diagnosis | ○ Iron, charcoal , bismuth | ○ Diverticulosis, angiodysplasia, infectious colitis |

❖ **What is meant by spurious melena?**

○ Due to ingestion of blood of epistaxis or haemoptysis

❖ **How does the patient pay attention to melena?**

- Blood in intestine → diarrhea → attention

❖ **How could you differentiate between melena & iron therapy as a causes of dark stool?**

| | Melena | Iron therapy |
|---|---|---|
| • History of drug intake | -ve | +ve |
| • History of bowl habits | Diarrhea "blood is irritant to GIT" | Constipation |
| • Stool examination : consistency | Soft | Hard |
| • Stool examination : Odour | Offensive | Usual odour of stool |
| • Dilute the stool by water : | Red | Grayish |

❖ **How to detect occult blood in stool ?**

1) **Guaiac test :** stool + ether + guaiac reagent → blue color in positive cases
2) **Benzidine test :** less reliable as it gives positive results with iron therapy
3) **Isotopic method :** RBCs labeled with Cr 51

❖ **What are the causes of jaundice & fever ?**

| A. Hemolytic jaundice + fever | B. Obstructive jaundice + fever | C. Hepatocellular jaundice + fever |
|---|---|---|
| ○ Hemolytic crisis<br>○ Pulmonary embolism<br>○ Incompatible blood transfusion<br>○ Malaria | • Charcots triad : fever & rigors + Jaundice + biliary colic (pain)<br>○ Malignancy | ○ Viral hepatitis (preicteric phase)<br>○ Liver cell failure<br>○ Hepatoma |

❖ **What are the hepato-toxic drugs you know?**

**A. Dose dependent e.g. Acetaminophen (Paracetamol)**

- **It's safe in usual doses**
- **Indication :** analgesic antipyretic, used when aspirin is contraindicated as in:

| | | | | |
|---|---|---|---|---|
| ▪ Peptic ulcer | ▪ Bronchial asthma | ▪ Pregnancy | ▪ Bleeding tendency | ▪ Aspirin allergy |

- **Toxic dose :** 15 gm ( 30 قرص )
- **Antidote:** N-acetyl cysteine

**B. Dose Independent :**

| | | | | |
|---|---|---|---|---|
| ▪ Acute hepatitis | INH | Alcohol | Halothane | Paracetamol |
| ▪ Chronic hepatitis | INH | Alcohol | Methyldopa | DDT |
| ▪ Cirrhosis | INH | Alcohol | Methyldopa | Methotrexate |
| ▪ Cholestasis | Androgen | Estrogen | Chlorpromazine | |
| ▪ Tumors | Androgen | Estrogen | | |
| ▪ Fatty liver | Alcohol | Steroids | Valproic acid | Tetracycline |

❖ **What are the definition & causes of heart burn = pyrosis = cardialgia?**

- **Definition :** Vague retrosternal burning sensation due to acid regurgitation from stomach
- **Aggravated by** recumbence, leaning forward & meal
- **Relieved by** antacids
- **Causes :**

- Functional : stress

- Organic : GORD, hiatus hernia, peptic ulcer

❖ **How can you differentiate between heart burn & ischemic heart?**

| | Heart burn | Ischemic heart |
|---|---|---|
| Aggravated by | Recumbence, leaning forward & meal | Exercise |
| Relieved by | Antacids | Rest & nitrates |

❖ **How can you differentiate between esophageal spam & ischemic heart?**

| | Esophageal spam | Ischemic heart |
|---|---|---|
| ECG changes | Present | Present |
| Nitrates | Relief | Relief |
| Endoscopy | The only diagnostic way to differentiate between both | |

❖ **What are the definition & causes of :**

**A. Diarrhea :** Frequent bowel motions (> 4 / day) or loose stools or both

- Causes : causes of dysentery

**B. Tenesmus:** تعنية

- Frequent painful desire to defecate + sense of incomplete bowel evacuation
- Causes : rectal lesion (inflammation or mass)

**C. Dysentery:** diarrhea + tenesmus + blood + mucus in the stool إسهال مع دم ومخاط أبيض + تعنية

- Causes are :

| | | | |
|---|---|---|---|
| ▪ Infective: | ○ Bacterial (bacillary) | ○ Protozoal (ameba, guiardia, malaria) | ○ Metazoal (bilharzial) |
| ▪ Metabolic: uremic | ▪ Toxic: mercury poisoning | ▪ Local: diverticulosis, ulcerative colitis, cancer colon | |

**D. Constipation :** infrequent evacuation of bowel (> 48 hr.) + passage of hard small stools

- Causes: lack of fiber & fluid intake, myxedema, TB peritonitis & typhoid fever.

### ❖ What are the medical causes of itching (pruritus)?

| | | |
|---|---|---|
| • Obstructive jaundice | • Primary biliary cirrhosis | • Diabetes mellitus |
| • Bilharziasis | • Drug hypersensitivity | • Chronic renal failure |
| • Hemolytic anemia | • Polycythemia | • Lymphoma & leukemia |

### ❖ What are the significance of time, content & odour of vomiting ?

| A. Time : | B. Contents : |
|---|---|
| ○ Early morning : CNS<br>○ During meals : esophageal obstruction<br>○ 1/2 hr. After meals : gastric ulcer<br>○ 2-3 hr. After meals : duodenal ulcer<br>○ > 8 hr. After meals : pyloric obstruction | ○ Mucus : chronic Gastritis & malignancy<br>○ Fecal matter : intestinal obstruction<br>○ Bile : regurgitation of duodenal contents<br>○ Parasites : ascaris<br>○ Blood : peptic ulcer & cancer stomach<br>○ Stone : cholecystogastric or duodenal fistula |
| C. Odour :<br>○ Foul : pyloric obstruction & cancer stomach<br>○ Fecal :intestinal & gastrocolic fistula | |

### ❖ What are types of pain related to uro-genital system?

| | | |
|---|---|---|
| • **Renal :** dull ache in loin referred to hypochondrium | • **Ureteric :** colicky from loin to groin | • **Bladder :** suprapubic referred to tip of penis |
| • **Prostatic :** bladder pain + perineal pain | • **Uretheral :** burning (scalding) pain during mi duration | |

### ❖ What are the micturition disturbances related to uro-genital system?

| | | |
|---|---|---|
| • **Dysuria :** pain experienced prior to, during or after micturition (gonorrhea) | • **Strangury :** in addition to dysuria there is intense desire to urinate every few minutes without relief of pain = vesical tenesmus | • **Frequency:** ↑ frequency of micturition in cystitis, DM, prostatic enlargement (urine volume may be constant) |
| • **Urgency :** strong desire to micturition (cystitis) , Incontinence occur if no opportunity to urination | • **Precipitancy:** severe urgency, Patient can not hold his urine (UMNL) | • **Hesitancy :** difficult to start micturition (prostate) |
| • **Second micturition :** in large bladder diverticulae | • **Retention :** acute or chronic<br>• **Enuresis :** involuntary voiding of urine during sleep | • **Difficult to maintain act:**<br>○ ↓ by straining : urethral stricture<br>○ ↑ by straining : prostate |
| • **Stream abnormalities :** continuous or interrupted, thick or thin, strong or weak, biforked or one stream | | |

### ❖ What are urine abnormalities in volume, colour, content?

| A. Volume abnormalities: | B. Colour abnormalities: | C. Abnormal contents : |
|---|---|---|
| • **Polyuria :** volume of urine<br>○ > 1500 CC / 24h.<br>• **Oliguria :** volume of urine<br>○ < 400 CC. / 24h.<br>• **Anuria :** complete absence of urine > 12-24 hours | • **Red :** hematuria, hemoglobinuria, food (beet root) & drugs (Rifampicin)<br>• **Dark (tea-like) :** obstructive & hepatocellular jaundice<br>• **Milky or cloudy :** pyuria, phosphaturia , chyluria | • **Blood (hematuria) : 3 glass test;**<br>○ Initial : urethral<br>○ Terminal: bladder<br>○ Total : renal<br>• **Shreds of tissues (necroturia) :** in bladder cancer<br>• **Stones :** Number, size, colour & shape<br>• **Gas (pneumaturia) :** in vesicocolic fistula |

### ❖ What are the definition & causes of :

| ❖ Salivation disturbances : | |
|---|---|
| ❁ **Ptyalism:** Increased salivation ريقي سايب | ❁ **Xerostomia "aptyalism" :** Dry mouth ريقي ناشف |
| ▪ Causes: | |
| ▪ **True :** inflammation & tumors of tongue, gums<br>▪ **False:** facial palsy | ▪ Mouth breathers<br>▪ Sjogren's syndrome<br>▪ Dehydration, Depression, Drugs : atropine<br>▪ DM, Uremia |

# General Examination Of Abdominal Case

**❖ Examination as general examination but stress on the following:**

## I. Vital signs

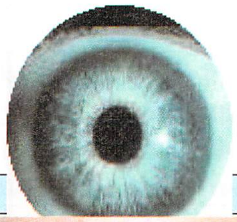
| ❖ Temperature | ❖ Pulse | ❖ Blood pressure | ❖ Respiratory rate |
|---|---|---|---|
| ❖ Low grade fever in LCF<br>❖ High grade fever in viral hepatitis & spontaneous bacterial peritonitis | ❖ Tachycardia & Water hammer pulse in LCF: vasodilator materials<br>❖ Bradycardia in obstructive jaundice | ❖ Decrease diastolic pressure (VD) in advanced LCF | ❖ Rhythm: Irregular in hepatic coma<br>❖ Type: thoraco-abdominal |

## II. General overview

| A. Appearance | B. Built | C. Consciousness | C. Colors | D. Decubitus | E. Expression |
|---|---|---|---|---|---|
| ▪ Emaciation = Wasting:<br>Spider man: combination of thin limbs & protuberant abdomen due to ascites due to liver cirrhosis | ▪ Underbuilt :<br>- Stunted growth in chronic liver disease since childhood<br>▪ Overbuilt :<br>- Autoimmune hepatitis treated by cortisone<br>- Cholecystitis | ▪ Disturbed in hepatic encephalopathy | ❖ Pallor in anemia in LCF<br>❖ Cyanosis :LCF<br>❖ Jaundice : refer to general chapter<br>❖ Hyperpigmented : in hemochromatosis &LCF | ▪ Orthopnea in tense ascites | ▪ Mongoloid facies in chronic hemolytic anemia |

**❖ What are the mechanisms of central cyanosis & clubbing in LCF?**

1. Opening of pulmonary AV shunt due to vasodilator material
2. Porto-pulmonary shunts
3. Basal lung collapse due to tense ascites

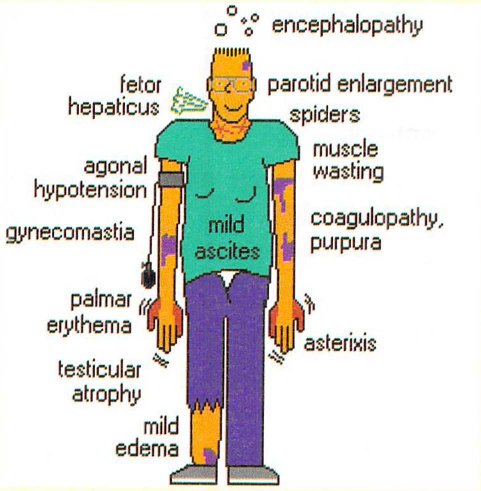


## III. Systemic overview :

### ❖ Head & Neck

- ○ Cornea: Kayser-Fleischer rings : in Wilsons disease : greenish brown rings
- ○ Hyperpigmented macules on the lips and oral mucosa (Peutz–Jeghers syndrome)
- ○ Thyroid swelling with Lupoid hepatitis
- ○ LN enlargement in lymphoma & leukemia & TB

### ❖ Manifestation of liver cell failure in head & neck :



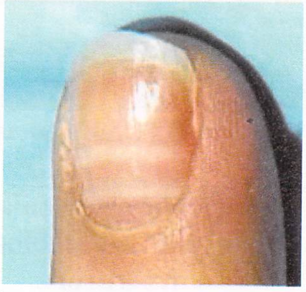
- **Hepatic encephalopathy** (terminal) due to increase ammonia: SAD
  - Sleep disturbances (somnolence & inverted sleep rhythm),
  - Speech disturbances (slurred speech or monotonus speech)
  - Apathy, Asterixis
  - Disturbed personality & behavior
  - DCL with disorientation for time, place & person
- **Fine silky hair**
- **Jaundice (hepatocellular):** orange yellow sclera, pale stool, dark urine
- **Pallor** in conjunctiva , lips; all types of anemia.
- **Central cyanosis** in tongue
- **Foetur hepaticus :** faecal odour simulating rotten apple due to lack of demethylation of methyl mercaptan
- **Skin:** spider naevi, xanthelasma , bleeding tendency
- **Endemic parotitis :** bilateral painless enlarged parotid
- **Congested neck veins** (cor-pulmonale & massive ascites)

**If spider naevi disappeared in a hepatic patient … what are the possibilities?**

- ◆ Improvement
- ◆ Terminal (hypovolemia → hypodynamic circulation)

## ❖ Manifestation of liver cell failure in limbs (Upper & Lower limbs):

- Asterixis : Flapping tremors
- Palmar erythema
- Palmar or tendon xanthomata
- Pallor "Anemia"
- Pigmentation in hemochromatosis, primary biliary cirrhosis & extra-hepatic manifestation of HCV.
- Paper money skin : numerous small vessels scattered through the skin in random fashion due to excess estrogen
- Capillary pulsation : hyperdynamic circulation
- Cyanosis
- Cyanotic clubbing
- Changes in Nail:
  - Koilonychia : spooning in iron deficiency anemia
  - Leukonychia: white opaque in hypoalbuminemia
  - Muehrcke's nails: transverse white bands parallel to lunula in hypoalbuminemia



- Dupuytren Contracture in alcoholic liver cirrhosis
- Edema : bilateral pitting lower limb edema
- Spider naevi
- Scratch Marks
- Subcutanoues hemorrhage : Bleeding tendency : petechiae, purpura & ecchymosis
- Skin & Muscles : Warm hand & Wasting of muscles

❖ What is the mechanism of bleeding tendency in LCF ?

| A. Defect in platelets: | B. Defect in clotting factors : |
|---|---|
| • Thrombocytopenia "decreased platelets" due to hypersplenism<br>• Thrombocytopathy due to diseased platelets due coating by toxins | → Deficiency of :<br>○ Prothrombin, Fibrinogen<br>○ Factors : V, VII, IX , X |

❖ What are the causes of edema of lower limb & ascites in abdominal case?

| | | |
|---|---|---|
| ○ Liver cirrhosis | ○ Mal-absorption syndrome | ○ Protein losing enteropathy |
| ○ Bilharzial cor pulmonale | ○ Malnutrition | ○ Nephrotic syndrome |

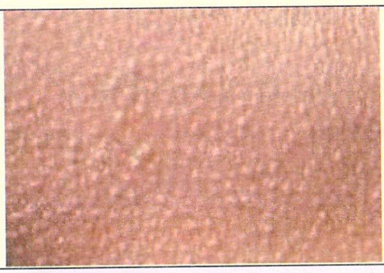
## IV. Other systems except that of local exam :

| ❖ Cardiac examination | ❖ Chest examination | ❖ Renal examination | ❖ Neurological examination |
|---|---|---|---|
| ▪ As a cause :<br>○ Cardiac cirrhosis<br>○ SBE = splenomegaly<br>▪ As a result :<br>○ Bilharziasis<br>○ Cor- pulmonale | ▪ As a cause :<br>○ Core-pulmonale<br>▪ As a result :<br>○ Amoebic liver abscess<br>○ Hydatid cyst<br>○ Hepato-pulmonary syndrome<br>○ Guillian Barre syndrome (extra-hepatic complication of HBV & HCV)<br>▪ As an association :<br>○ Alpha one antitrypsin deficiency | ▪ As a result :<br>○ Hepato-renal syndrome<br>○ Pre-renal failure (acute GIT bleeding)<br>○ Nephrotic syndrome (extra-hepatic complication of HBV & HCV, schistosoma mansoni) | ▪ As a cause:<br>○ Autoimmune peripheral neuropathy (gastroparesis diabeticorum)<br>▪ As a result :<br>○ Hepatic encephalopathy<br>▪ As association :<br>○ Hepato-lenticular degeneration " Wilson's disease) |

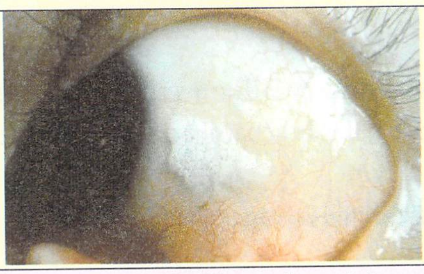
## ❖ Manifestation of vitamin deficiencies as findings during general examination:

### Vitamin A (Retinol)

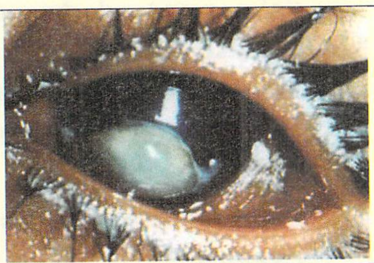
- ○ Follicular hyperkeratosis (goose like skin)



- ○ Xerophthalmia : Bitot's spots : dryness & keratinization of conjunctiva

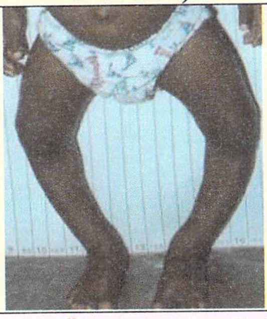


- ○ Keratomalacia, night blindness



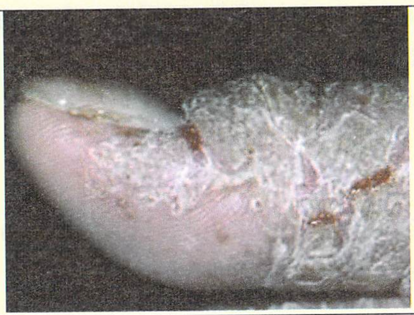
### Vitamin D (Cholecalciferol)

- ○ Rickets or osteomalacia (bone pain & pathological fracture)



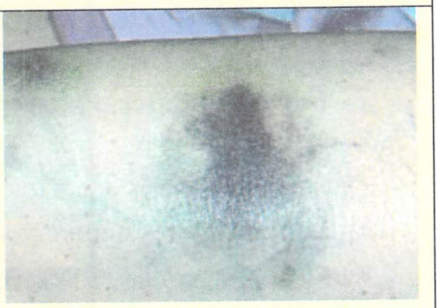
### Vitamin E (Tocopherols), Vitamin B7 (Biotin)

- ○ Dermatitis



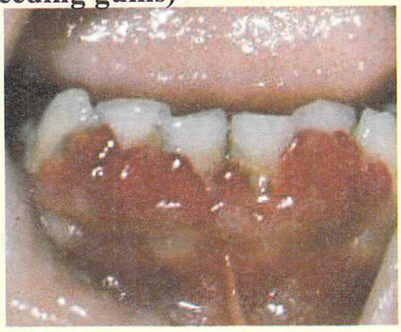
### Vitamin K (phylloquinone)

- ○ Hypoprothrombineniia (bleeding tendency)



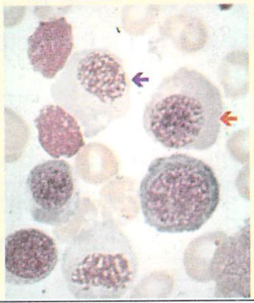
### Vitamin C (ascorbic acid)

- ○ Scurvy (bleeding gums)



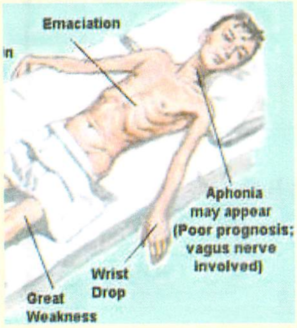
### Folic acid (Vitamin B9)

- ○ Megaloblastic anemia



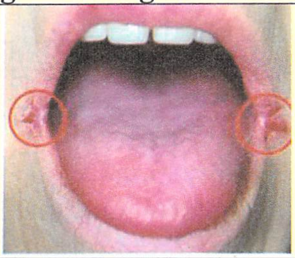
### Vitamin B1 (thiamine)

- ○ Beri - Beri

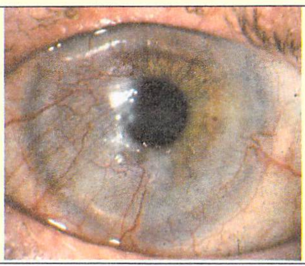


### Vitamin B2 (Riboflavin)

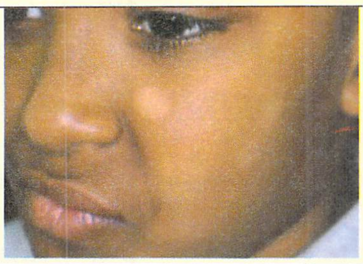
- ○ Angular stomatitis & cheilitis , Red glazed tongue



- ○ Circumcorneal vascularization

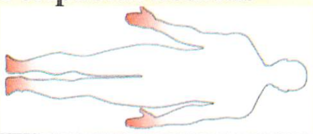


- ○ Pityriasis alba



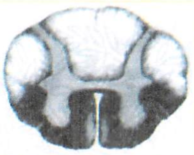
### Vitamin B5 (Pantothenic acid)

Peripheral neuritis



### Vitamin B12 (cobalamin)

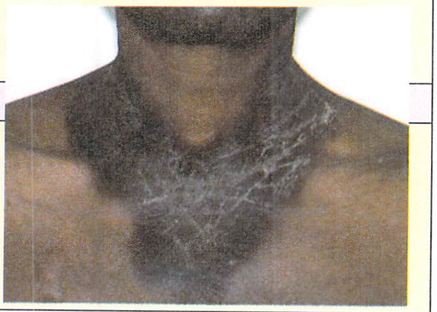
- ○ Megaloblastic anemia
- ○ GIT : glossitis , dyspepsia , diarrhea
- ○ CNS :
  - Subacute combined degeneration of spinal cord



### Vitamin B6 (pyridoxine):

Dermatitis & peripheral neuritis

### Nicotinic acid (Niacin) (Vitamin B3) :



- ○ Pellagra : Pellagric rash :
  - ▪ Site on sun exposed & pressure areas (heels, knees & trochanters)
  - ▪ Descrption :
    - Hyperkeratosis (rough skin, scaly desquamated) & Hyperpigmentation
- ○ Red glazed tongue

# Local Examination Of Abdominal Case

**❖ Rules :**

1. Good light
2. Exposure the patient's abdomen from nipples down to knees
3. Position of the patient :
   - ○ Supine position with his arm at sides and knee slightly flexed to relax the abdominal wall ( muscles & Scarpa's fascia which is the membranous layer of the superficial fascia of the abdomen)
   - ○ Sitting, if the doctor will examine the back
   - ○ Standing, if the doctor will examine for hernia & genitalia
4. Examine from the patient's right side
5. Make sure that the patient is comfortable in this position

**❖ Examination:**

| | | | |
|---|---|---|---|
| I. Inspection | II. Palpation | III. Percussion | IV. Auscultation |

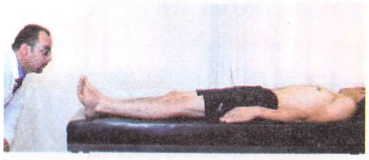
❖ Inspection : Anterior + Posterior

| 🕮 2 general | 🕮 7 in midline | 🕮 8 on sides |
|---|---|---|
| ▪ Contour of the abdomen<br>▪ Movement with respiration | ▪ Subcostal angle<br>▪ Divarication of recti<br>▪ Umbilicus<br>Epigastric pulsation<br>▪ Visible peristalsis<br>▪ Suprapubic hair distribution<br>▪ External genitalia | ▪ Breast<br>▪ Dilated veins<br>▪ Scars<br>▪ Scratch marks<br>▪ Striae<br>▪ Subcutaneous hemorrhage<br>▪ Edema of abdominal wall<br>▪ Hernial orifices |

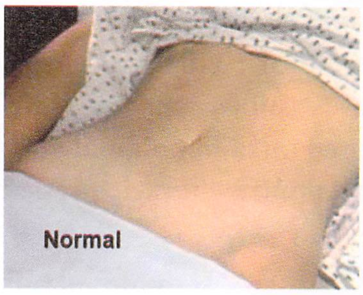
## I. Inspection of the ABdomen = Anterior + BACK

### ❖ Anterior Aspect : general , midline, sides

### ❖ 2 General:



### 1) Contour of the abdomen (transverse & antro-posterior diameter)



❂ **Technique :** Tangentially بص مرة من حرف السرير ومرة من الجنب

❂ **Normally:**

- ☞ Slightly scaphoid from up downwards
- ☞ Preserved waist (convex) from side to side
- ☞ With empty flanks

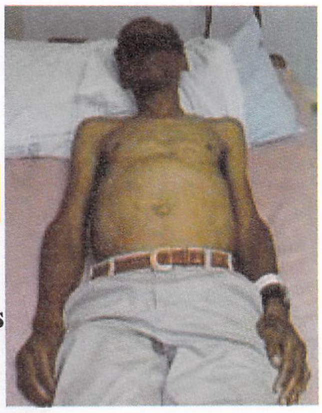
❂ **Abnormally :**

1. **Marked Retraction (scaphoid):** starvation, dehydration & wasting diseases e.g. malignancy, TB
2. **Bulging (distention): localized or generalized :**

A. Localized = Visible masses e.g. organ swelling: liver, spleen, … etc.

❖ **Comment on:**

- ▪ **Rising up test & observe the mass** حط ايدك على راس العيان وقوله هم براسك
  - → Extra-abdominal mass: Increase in size
  - → Intra-abdominal mass: Decrease in size
- ▪ **Movement with respiration:**
  - → Extra-abdominal mass : moves in & out with respiration if related to abdominal muscles
  - → Intra-abdominal mass : moves up & down with respiration if related to diaphragm
- ▪ Site , size, shape, surface, , skin & Pulsations



Localized Bulge →

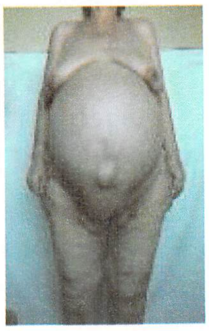
**B. GENERALIZED abdominal distention , Causes :**

**Ascites one of the signs of LCF**

| | | | |
|---|---|---|---|
| 1. **Fluid** : ascites , ovarian cyst | 2. **Full bladder** | 3. **Faeces** | 4. **Fat** (obesity) |
| 5. **Fetus**: signs of pregnancy | 6. **Flatus**: hyper-resonance all over the abdomen | | 7. **Fibroma** |

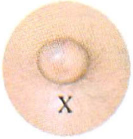
❖ **How to differentiate between ascites (free fluid) & ovarian cyst (encysted fluid) ?**

| | Ascites | Ovarian cyst |
|---|---|---|
| ▪ Distention | ▪ Diffuse | ▪ Mainly central |
| ▪ Umbilicus | ▪ Shifted downward | ▪ Shifted upward |
| ▪ Percussion | ▪ Central resonance & dull flanks | ▪ Central dullness & resonance flanks |
| ▪ Shifting dullness | ▪ Bilateral | ▪ May be unilateral |
| ▪ By US | ▪ Free fluid | ▪ Encysted fluid |



Ovarian cyst

❖ **How to differentiate between ascites & obesity?**



| Ascites | Obesity |
|---|---|
| Umbilicus is everted | Umbilicus is tucked in |

## 2) Movement with respiration:

❖ **Technique :** tangentially خلي العيان يتنفس عادي وبص من الجنب

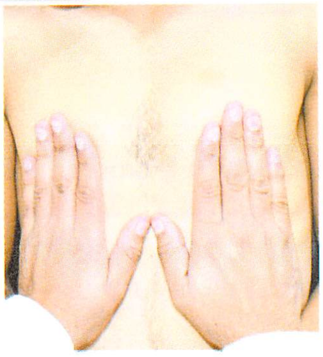
❖ **Normally :** abdomen moves freely with respiration (bulge during inspiration & retract during expiration)

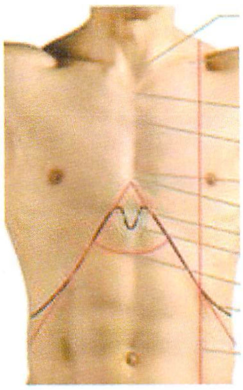
❖ **Abnormally :**

| | |
|---|---|
| ○ **Limited:** Tense ascites | ○ **Absent:** Acute peritonitis |
| ○ **Diaphragmatic paralysis:**<br>○ Unilateral : one side moves only (See-saw movement)<br>○ Bilateral : paradoxical movement i.e. opposite the normal | |

## ❖ 7 in Midline:

## 1) Subcostal angle:





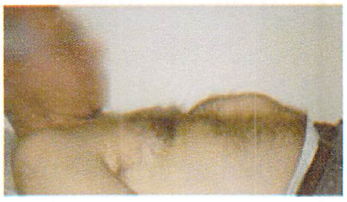
❖ **Technique :** thumb test at xiphi-sternal junction

❖ **Normally : acute to right angle = 90 ° (60°–110 °):**

- Tall & thin : more acute : 60 °
- Short & obese: obtuse : 110 °

❖ **Abnormally : wide obtuse subcostal angle (180 ° ) , causes:**

- Chronic increased intra-abdominal pressure (upper swellings & ascites)
- Chronic increased intra-thoracic pressure e.g. COPD



## 2) Divarication of recti

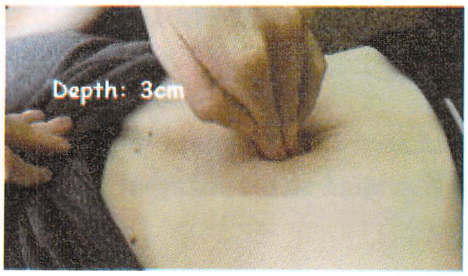
❖ **Definition** : widening & stretching of linea alba

❖ **Etiology :** chronic increase in intra-abdominal pressure (upper swellings & ascites), (it may be congenital)

❖ **Types :** complete (above & below umbilicus), partial (one side)

❖ **Differential diagnosis :** fatty hernia of linea alba & epigastric hernia

❖ **Technique :**



- حط إيدك على رأس العيان وقوله يهم برأسه وبص على ال recti
- وحط ايديك عمودية على البطن وحاول تدخل أطراف الأصابع بين ال 2 recti
- في الطبيعي ← متقدرش تدخل صوابعك
- لو في Divarication ← تقدر تدخل صوابعك وتحرك من جنب لجنب.

## 3) Umbilicus : 4S + 2D

1. **Site :**

❖ **Normally :** midway between xiphisternum & symphysis pubis

❖ **Abnormally :**

- Shifted downwards in Ascites & upper abdominal swellings : hepatic & splenic enlargement
- Shifted upwards in pelvi-abdominal masses

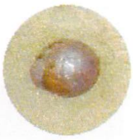
2. **Shape :**

❖ **Normally :** inverted (attached to umbilical ligament)

❖ **Abnormally :** everted in **increased intra-abdominal pressure** (upper swellings & ascites) or in umbilical & paraumblical **hernia**

3. **Swellings:**

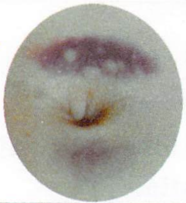
- **Nodule**: endometriosis & Sister – Mary Joseph nodule in GIT, Liver, Breast Carcinoma
- **Hernia** : expansile impulse on cough

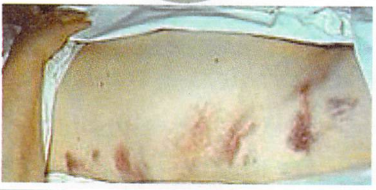


> → **What are other causes of expansile impulse on cough ?**
> 📖 Meninogocele, laryngocele, penumatocele , empyema necessitans, saphina varix & hernia

4. **Skin pigmentation:**

- **Addison's disease** & TB peritonitis
- **Cullen's sign :** bruising around the umbilicus suggests intra-peritoneal bleeding
- **Gray Turner's sign :** bruising in flanks area, suggests retroperitoneal bleeding





5. **Skin lesions:**

- **Scars & Ulceration**

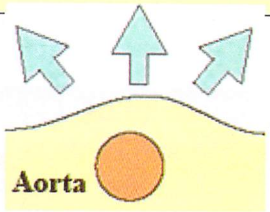
6. **Dilated veins** in **caput medusa** due to portal hypertension

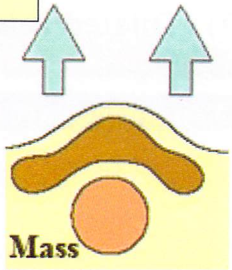
7. **Discharge :**

- **Pus :** inflammation **, Stool :** intestinal fistula, **Urine :** patent urachus

> → **What are the signs of chronic increased intra-abdominal pressure ?**
> 📖 Wide subcostal angle.
> 📖 Divarication of the recti.
> 📖 Umbilicus: everted, shifted downwards ± umbilical hernia.

## 4) Epigastric pulsations: see cardiology





- **RV enlargement :** in Bilharzial cor pulmonale
- **Hepatic pulsation** in tricuspid valve disease
- **Aorta :** normal, aortic regurge , aneurysm or solid mass transmitting aortic pulsation

→ **How can you differentiate between aortic pulsation or solid mass transmitting aortic pulsation ?**

| | Aortic pulsation | Solid mass |
|---|---|---|
| ▪ Two finger test | Expansile pulsation i.e. pulsates laterally & antro-posterior i.e. in all direction | Transmitted pulsation i.e. pulsates antro-posterior only |
| ▪ Pulsations on Knee- elbow position | Not affected | Disappears |

## 5) Visible peristalsis

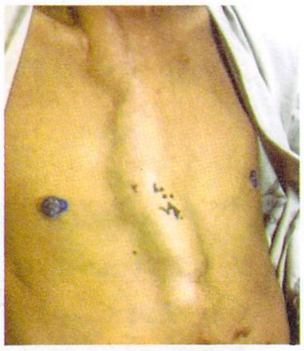
A. **Causes :**

❖ Occasional finding in **normal thin** individuals

❖ In **pyloric obstruction** : slow waves in upper abdomen , moves from left to right

❖ In **small intestinal obstruction** : step ladder pattern around umbilicus

❖ **Colonic obstruction** : Horse shoe pattern



B. **Techniques to Stimulate it:**

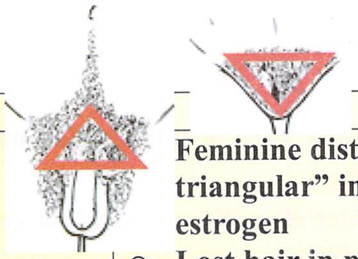
❖ Gentle tapping, or massage

❖ Cold stimulation of skin (2 drops of ether)

❖ Drinking soda water

C. **Confirmed by** succussion splash *"in auscultation"*

## 6) Supra-pubic hair distribution



❖ **Normally :**

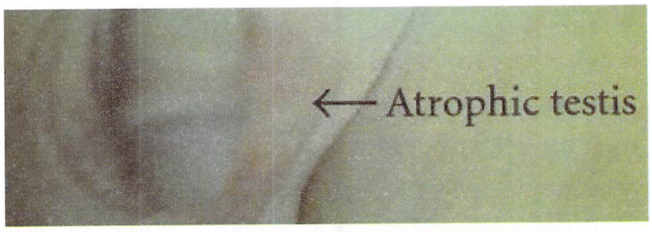
- ○ **Male :** triangular with apex towards umbilicus (Diamond shape)
- ○ **Female :** triangular with upper horizontal line

❖ **Abnormally**

Feminine distribution "straight instead of triangular" in **LCF** due to lack of destruction of estrogen

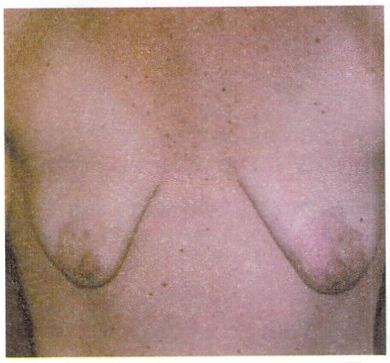
- ○ Lost hair in male & female : hypogonadism

## 7) External genitalia العيان واقف

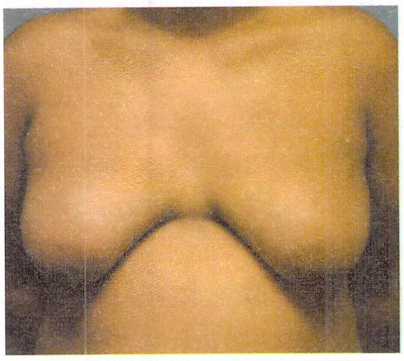


❖ **Importance of genitalia in abdominal case:**

- **Testicular atrophy by consistency (small & soft) with LCF**
- Thick spermatic cord: Bilharzial mass
- Scrotal edema in nephrotic syndrome
- Hydrocele in ascites
- Varicocele intra-abdominal tumour
- Sinus in back of scrotum TB peritonitis



Atrophic Breast



Gynecomastia

## ❖ 8 on sides :

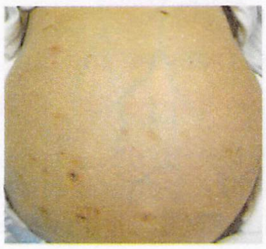
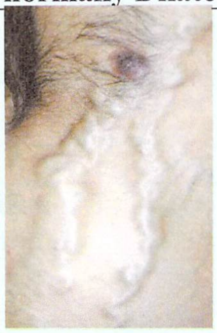
## 1) Breast:

1. **Atrophy of female breast in LCF**
2. **Gynecomastia:**

- **Definition :** hypertrophy of glandular tissues of male breast with prominent nipples
- **Characters :** firm & tender, ± bilateral
- **Causes** of gynecomastia in liver cirrhosis : **LCF** (↑ estrogen) - drugs (spironolactone, digoxin)
- **Diagnosis :** dick test → firm tender disc beneath the nipple
- ضع ال thumb و ال index على جانبي ال breast من تحت خالص وتطلع لفوق لغاية ال nipple
- لو في حاجة وقفتك زي ال disc ← Gynecomastia
- لو مافيش حاجه وقفتك ← no gynecomastia

## 3) Dilated veins:

❖ **Veins which are found on the abdominal wall may be either :**

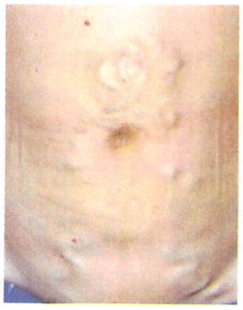
| | A. Just Visible veins | B. Abnormally Dilated veins |
|---|---|---|
| |  |  |
| Cause | Tense ascites | Obstruction |
| Shape | Straight | Tortuous |
| Diameter | Narrow | Wide |
| Level | Skin level | Elevated |
| Direction | Normal | Abnormal |

❖ **Veins which are confirmed to be dilated may be either :**

→ Portal veins obstruction: portal hypertension (caput medusa)

- **Caput medusa :** dilated veins radiating away from the umbilicus & caused by reopening of **umbilical vein** by the high pressure of portal vein in case of **portal hypertension**

→ Systemic veins obstruction (SVC or IVC)



Caput medusa →

### Differential Diagnosis between them :

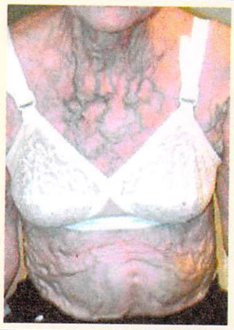
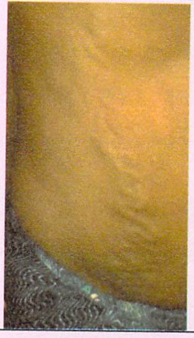
| | Portal obstruction" caput medusae" | Systemic obstruction |
|---|---|---|
| ○ Inspection : site | ▪ Center , around umbilicus | ▪ Peripheral |
| ○ Palpation : direction of blood flow | ▪ Away from umbilicus | ▪ SVC: from up down<br>▪ IVC: from down up |
| ○ Auscultation : venous hum | ▪ Yes: venous hum | ▪ No |
| ○ Investigations | | |
| ○ Infrared photography | ▪ Diagnostic | ▪ Diagnostic |
| ○ Oral glucose test (old test) | ▪ Higher concentration | ▪ No difference |
| • Oral glucose test : Glucose absorbed from the intestine to the abdominal veins i.e. portal venous blood, which now has higher glucose concentration than that of systemic veins | | |

### ❖ Systemic veins obstruction may be either:

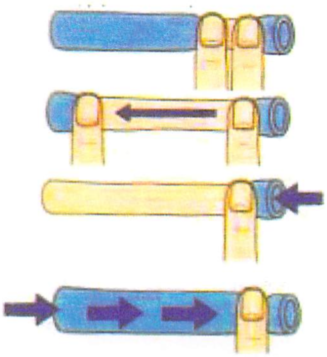
→ SVC obstruction

→ IVC obstruction

### Differential Diagnosis between them :

| | SVC obstruction | IVC obstruction |
|---|---|---|
| |  |  |
| ○ Direction | ▪ Above downwards | ▪ Below upwards |
| ○ Site | ▪ Crosses costal margin<br>▪ Upper abdomen & chest | ▪ Crosses the inguinal ligament<br>▪ Lower abdomen |

**Determination of direction of blood flow by: milking technique → rapid refilling**

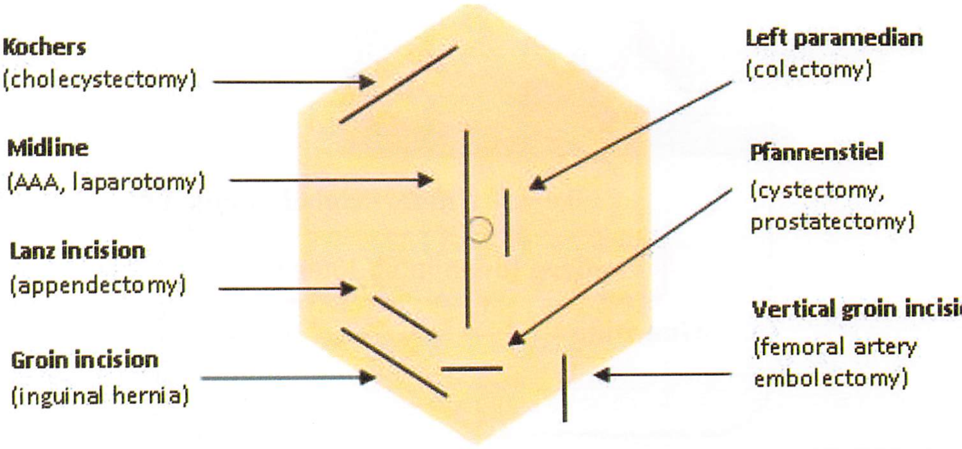


- ○ اختر segment تكون أطول ما يمكن و without tributaries
- ○ فضيها من الدم بال 2 indices
- ○ ارفع ال index اللي فوق وشوف سرعة امتلاء ال vein
- ○ ثم فضيها مرة أخرى
- ○ ارفع ال index اللي تحت وشوف سرعة امتلاء ال vein
- ○ في المرتين ال vein هيتملي ولكن الأسرع فيهم هو اللي هيحدد اتجاه الدم

## 3) Scars

### A. Surgical scar

- ❖ **Name of scar (see the diagram)**
- ❖ **Healing** either by Primary or secondary intention.
- ❖ **Complication :** Sinus formation, keloid, pigmentation, delayed healing, bleeding, infection, incisional hernia (impulse on cough)

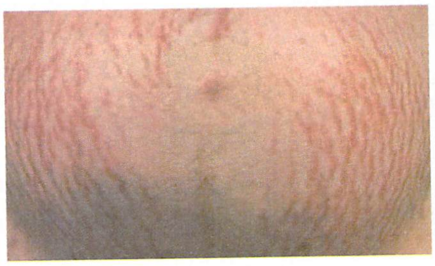

Kochers
(cholecystectomy)
Midline
(AAA, laparotomy)
Lanz incision
(appendectomy)
Groin incision
(inguinal hernia)
Left paramedian
(colectomy)
Pfannenstiel
(cystectomy, prostatectomy)
Vertical groin incisi
(femoral artery embolectomy)

### B. Cautery Scar

- May localize the **site** of the pain
- It **minimizes** pain (counter irritation)
- **Disadvantages:**
  - Bad cosmetic appearance
  - Excessive adhesions (surgery will be difficult if needed)

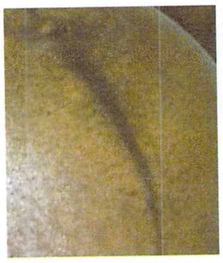
### 4) Scratch marks in obstructive jaundice

### 5) Striae



S. Rubra

S. Alba



S. Nigra

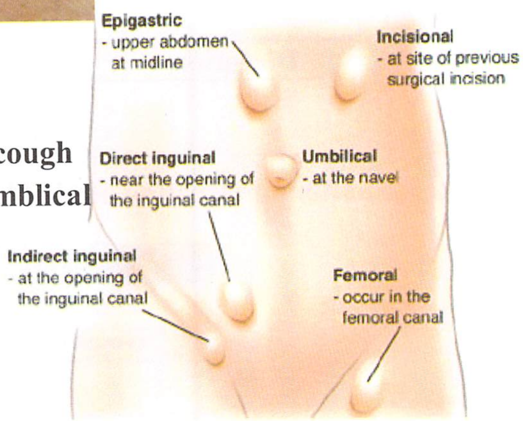
- **Etiology** :due to rapid stretching of abdominal wall with rupture of elastic fibers :
- **Types:**
  - A. Striae rubra in cushing syndrome & steroid therapy
  - B. Striae alba in obesity , pregnancy (striae gravidarum), tense ascites, severe dieting & healed stria rubra
  - C. Sriae nigra in pregnancy

### 6) Subcutaneous hemorrhage: Petichae , purpura in hypersplensim & ecchymosis in LCF

### 7) Edema of abdominal wall : peau d'orange

### 8) Hernia orifices العيان واقف

- **Hernia indicates:** ↑ intraabdominal pressure + weak abdominal wall
- **Elicited by** coughing while patient is standing → expansile impulse on cough
- **Types:** Inguinal , Femoral , Linea ulba, Epigastric, Umbilical & paraumblical , Incisional (old scars) hernia.


Epigastric
- upper abdomen at midline
Incisional
- at site of previous surgical incision
Direct inguinal
- near the opening of the inguinal canal
Umbilical
- at the navel
Indirect inguinal
- at the opening of the inguinal canal
Femoral
- occur in the femoral canal

### ❖ Posterior Aspect = BACK العيان قاعد

- Back of the **patient** for swelling, scars, hair tuft in spina bifida & deformities e.g. kyphosis or scoliosis
- Back of the **breast** for monilial infection or masses
- Back of the **Knee** for Baker cyst
- Back of **scrotum** for TB sinus

## II. Palpation

❖ شروط الفحص :

1. المريض :
   - يثني رجلية نص تانية ← To relax superficial abdominal fascia & muscles
   - بياخد نفس عميق من بقه طول ما أنت بتحس

No deep fascia in abdomen

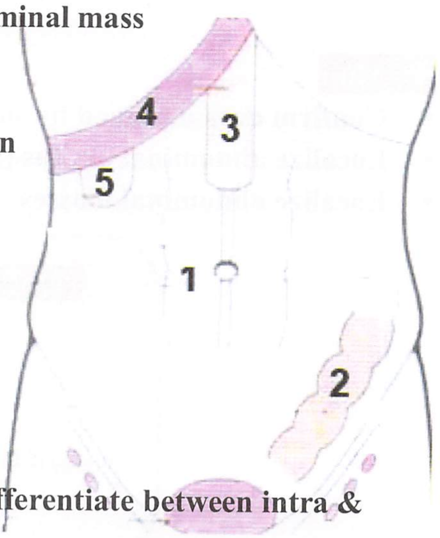
2. الدكتور :
   - دفي ايديك حتى لو دافيه ولازم الدكتور يشوفك وأنت بتعملها لأن لو ايديك باردة هتعمل ← Guarding
   - طول ما ايديك على بطنه عينك على وشه

❖ **Methods of palpation of abdomen:**

| | | |
|---|---|---|
| 1. Superficial (light) | 2. Deep | 3. Bimanual |
| 4. Hooking | 5. Dipping | 6. Rolling |
| 7. Ballotment | 8. Per-rectal examination (PR) | 9. Per-vaginal examination (PV) |

### ❖ Structure normally palpable:

1. Contracted muscles of the abdominal wall may be mistaken for an intra-abdominal mass
2. Caecum and descending Colon, when it is full of gases or fluids
3. Abdominal Aorta
4. Liver edge may be felt 1-3 cm below the right costal margin on deep inspiration
5. Lower pole of right kidney especially in females with lax abdominal wall.



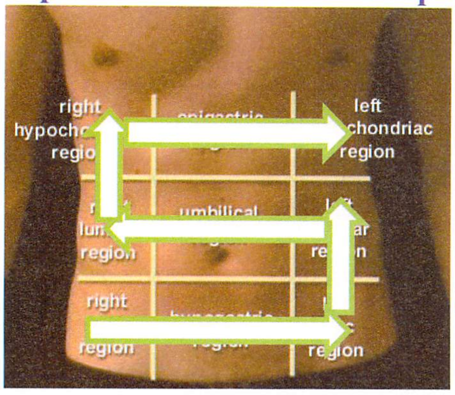
## ❖ Superficial palpation:

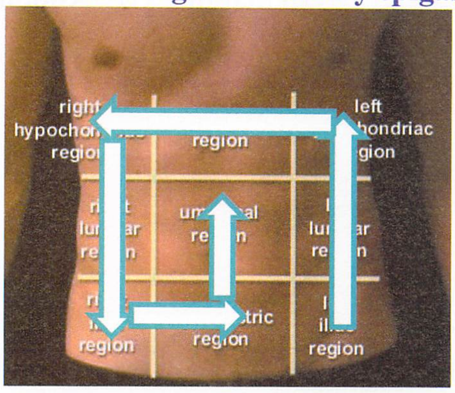
### ❖ Aim:

1. Gain patient's confidence
2. Detect : tenderness, hyperesthesia, temperature, guarding & rigidity
3. Detect superficial swellings e.g. lipoma , varicosities & hernia :
   - ○ Ask the patient to contract the abdominal wall muscles by raising the head (differentiate between intra & extra-abdominal swelling) and notice the swelling mobility with respiration.
4. To prepare the patient for deep palpation

### ❖ Method :

1. Place your extending hand flat on the patients abdomen
2. Gently press (1 cm depth) the patient's abdomen by flexion & extension of the metacarpal joints of fingers ( light dipping method)
3. Slowly progress around the 9 regions either in S or G shaped palpation
   - ○ Start palpation away from site of complaint → end by painful region
   - ○ Palpation of the abdomen in S shaped manner : start in right iliac region → end by left hypochondrial region
   - ○ Palpation of abdomen in G shaped manner : start in left iliac region → end by epigastric region





### ❖ What is the difference between guarding & rigidity?

| | Guarding "induced type" | Rigidity |
|---|---|---|
| Mechanism | Voluntary<br>contraction of anterior abdominal wall | Involuntary<br>contraction of anterior abdominal wall |
| Respiration | Disappears on inspiration | Present in inspiration & expiration |
| Movement with respiration | Free mobility | Limited |
| e.g. | During painful palpation | Peritonitis |

### ❖ How can you examine patient with Guarding ?

- ○ By Nicklson's technique:

- ▪ أيدي الشمال اعملها بيها Fist وأدوس على ال sternum وافحص بإيدي اليمين ,
فأنت كده خليت الحركة بتاعت ال chest تكون limited
وهيتنفس من بطنه فاجبرته انه يحرك بطنه فال guarding هيفك

### ❖ How to detect hyperesthesia?

- ○ Pinching test
- ○ أقرص العيان قرصة خفيفة ← تلاقيه ينط من الألم

### ❖ How to differentiate between lipoma, hernia & varicose vein on abdomen ?

| Lipoma | Hernia | Varicosities |
|---|---|---|
| ▪ No expansile impulse on cough | ▪ Expansile impulse on cough | ▪ Expansile impulse on cough |
| ▪ Slippery edge | ▪ Reducible | ▪ Thrill |

## ❖ Deep palpation:

### ❖ Aim:

- Confirm data obtained by superficial palpation
- Localize abdominal organs (organomeglay)
- Localize abdominal masses

**❖ قواعد خاصة لفحص ال Liver & spleen بالاضافة للشروط السابقة :**

- استخدم ال radial side of index أو tips of fingers
- ايدك تبقى flat مع ال abdomen
- حس ال organ في النقلة ما بين ال expiration وال inspiration
- دوس بايدك لما تيجي بطنه تنزل في ال inspiration ولما يخلص اطلع بايدك بهدوء
- إياك والعجن!

### ❖ For any abdominal swelling comment on :

| | | | |
|---|---|---|---|
| • Intra or extra-abdominal | • Movement with respiration | • Site | • Size |
| • Shape | • Skin over | • Edge | • Consistency |
| • Tenderness | • Pulsations | • Regional LN | |

### ❖ Organ Palpation :

| | | |
|---|---|---|
| ○ Liver | ○ Colon | ○ Para-aortic LN |
| ○ Spleen | ○ Peri-colic | ○ Mesenteric LN |
| ○ Kidney | ○ Urinary bladder | |
| ○ Gall bladder | ○ Abdominal aorta | |

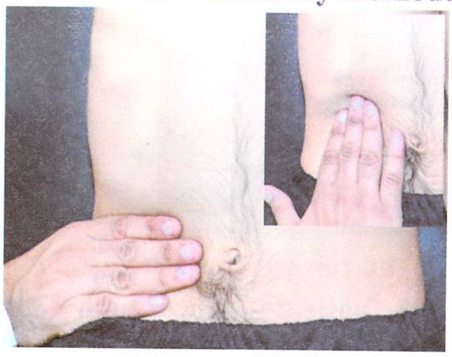
# Palpation of the Liver

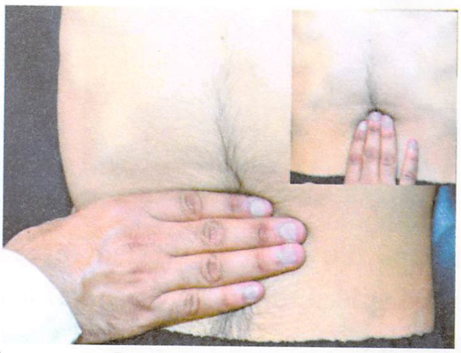
❖ Never palpate liver unless percussion of upper border.

❖ لا تنسى تطبيق قواعد الفحص

**❖ Techniques :**

1. **Single handed method = Ordinary method:** by right hand only



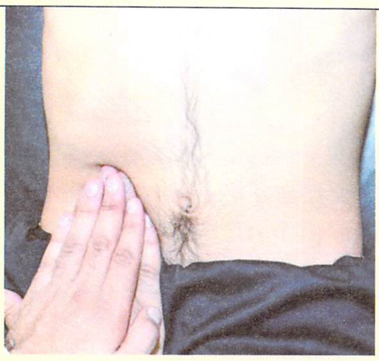


**A. Lower border of Right lobe** from Right iliac fossa in MCL upwards, lateral to rectus sheath.

- Place your right hand flat on the right iliac fossa in mid clavicular line & feel the liver edge during the peak of inspiration (or ask the patient to take deep breath in) in one of the following position :
  - ○ **Radial side of index finger:** Resting transversally parallel to the right costal margin & lateral to the rectus muscle
  - ○ **Tips of fingers (middle three fingertips) :** parallel to midline & lateral to the rectus sheath.

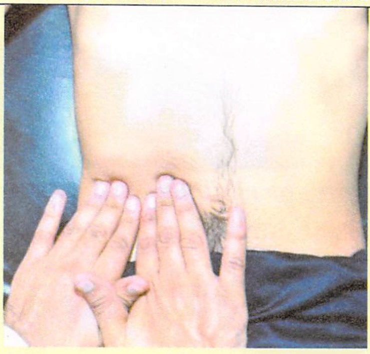
**B. Lower border for Left lobe :** from umbilicus in midline upwards

2. **Enforced method :**



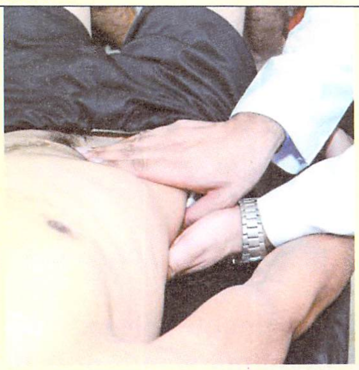
- *In thick (fatty) or rigid muscular abdominal wall*
- By tips of both hands OVER each other (left over right)

3. **Hutchinson method = two handed method :**



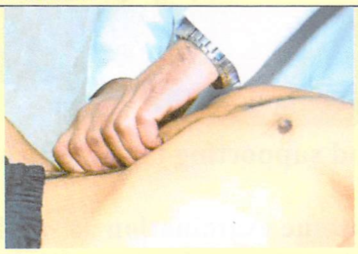
- *In thick (fatty) or rigid muscular abdominal wall*
- By tips of both hands BESIDE each other

4. **Bimanual method:**



- ○ **Examination of liver:** as ordinary method but with support by left hand in lumbar region just below the right costal margin with pushing forward making liver edge more prominent.

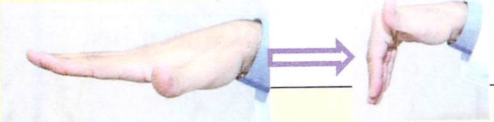
5. **Hooking method:**

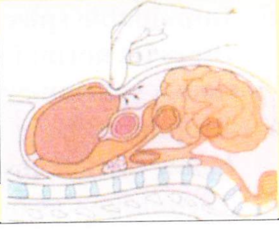


- If liver is *not felt* by previous methods e.g. *shrunken liver*
- ❖ The examiner stands near the head of the patient
- ❖ Place both hands, side by side under the right costal margin
- ❖ Fingers of both hands are flexed as a hook
- ❖ Ask the patient to take a deep breath & feel the liver edge.

6. **Dipping method** in *tense ascites* with **flexion at the metacarpo-phalangeal joint** at the region of liver just below the right costal margin.

- إعمل خبطة واحدة (أو خبطتين) من ال MCP Joints وخلي إيدك دايسة بعد الخبطة ما تشلهاش
  لو حاجة خبطت في ايدك ← Palpable
- عيب هذه الطريقة : ما تطلعش Data



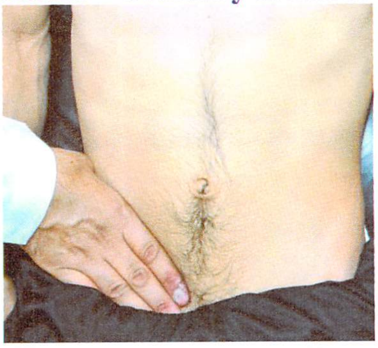


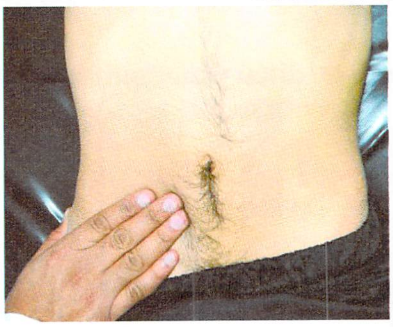
# Palpation of the Spleen

❖ لا تنسى تطبيق قواعد الفحص

**❖ Techniques :**

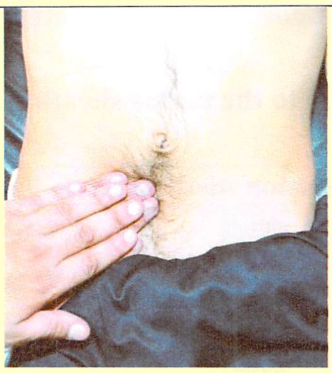
1. **Single handed method = Ordinary method:** by right hand only





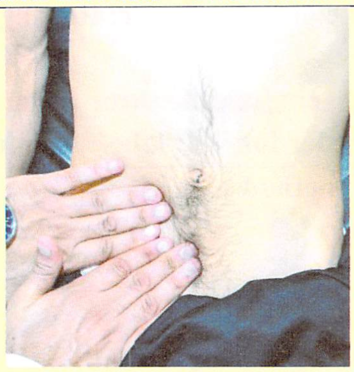
- Place your right hand flat on the right iliac fossa and direct your hand towards the left costal margin & feel the edge of enlarged spleen during the peak of inspiration (or ask the patient to take deep breath in) in one of the following position :
  - **Radial side of index finger:** parallel to the left costal margin
  - **Tips of fingers (middle three fingertips) :** perpendicular to the left costal margin

2. **Enforced method :**



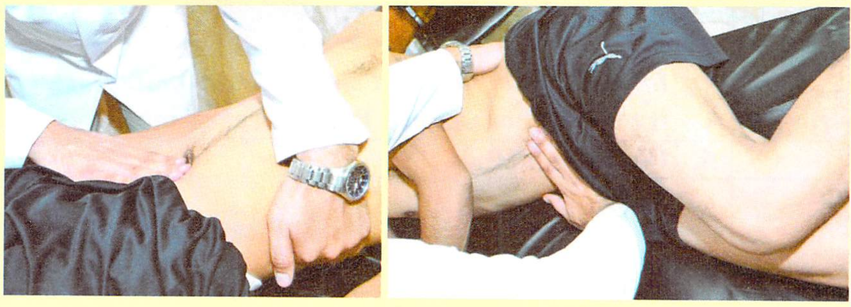
- *In thick (fatty) or rigid muscular abdominal wall*
- **By tips of both hands OVER each other (left over right)**

3. **Hutchinsion method = two handed method :**



- *In thick (fatty) or rigid muscular abdominal wall*
- **By tips of both hands BESIDE each other**

4. **Bimanual method:**

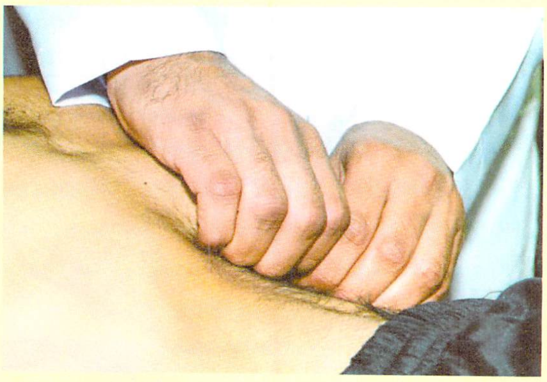


- Left hand supporting lower left rib cage & press forward.
  - And continue examination as single handed method by middle three fingertips from Right iliac fossa to left costal margin in the following position:
    - **In supine position** (with flexed knees & hips)
    - **IF NOT FELT** : do bimanual technique In **Right lateral position** (with flexed knees & hips)
    - **IF NOT FELT :** impalpable spleen ( don't not say: not enlarged)

**❖ N.B.:**

- **Palpable spleen** means, spleen enlarged 3 times or more than normal size.
  - **Impalpable spleen** means, spleen enlarged less than 3 times its normal size → Further evaluation needed to detect splenomegaly.

5. **Hooking method:** الدكتور هيقف على شمال العيان



- For Impalpable spleen.
- ❖ The examiner stands near the head of the patient on left side
- ❖ **Place both hands, side by side under the left costal margin**
- ❖ **Fingers of both hands are flexed as a hook**
- ❖ Ask the patient to take a deep breath & feel the spleen.

6. **Dipping method** in *tense ascites* with **flexion at the metacarpo-phalangeal joint** at the region of spleen just below the left costal margin.

- **Technique : as in liver**

## ❖ Comment on liver:

1. **Site:** in right hypochondrium
2. **Size:** normally not felt below costal margin

- ❖ **Enlarged :** in patient finger-breadths (or cm) in midline for left lobe & below costal margin in MCL for right lobe
- ❖ **Shrunken :** liver cirrhosis & Bilharzial fibrosis

3. **Border = Edge:** normally felt as resistance

- ❖ **Sharp :** liver cirrhosis & Bilharzial fibrosis
- ❖ **Rounded :** congenital, inflammatory, infiltration

4. **Surface:** normally smooth حرك ايدك على سطحه في دايره واسعة وحس السطح

- **Smooth :** congestion, inflammation, infiltration, cirrhosis
- **Irregular :** liver cirrhosis if macro-nodular &
- **Nodular :** malignancy

5. **Consistency:** normally soft

- **Soft & enlarged :** congenital, inflammation & infiltration
- **Firm :** Bilharziasis
- **Hard :** malignancy
- **Cystic :** amebic abscess & hydatid cyst

6. **Tenderness:** Test to exam tenderness : fist test in non-palpable liver

- إيدك الشمال مفرودة على سطح ال liver
- اخبط بقبضتك اليمين عليها خبطة خفيفة وبص على وش العيان وقارن مع الناحية المقابلة
- Congestion, inflammation & malignancy

7. **Pulsation:** TR, TS, hemangioma

- **Examination for pulsation by bimanual examination:** put on hand on the liver anteriorly and the other hand at the back, ask the patient to hold his breath and feel for pulsation.

## ❖ Comment on Spleen:

1) **Site:**
- In left hypochondrium

2) **Size :**
- Not felt below costal margin : normally or impalpable spleen
- if palpated : enlarged at least 3 times
- if enlarged & doesn't cross the midline (or umbilicus) : patient's finger breadth
- If crossing midline → huge spleen

3) **Border = edge :**
- Bilharziasis has a rounded anterior edge with one or multiple notch

4) **Surface :**
- smooth in Bilharziasis

5) **Consistency:**
  - Soft: in endocarditis, Malaria & septicemia
  - Firm in Bilharziasis

6) **Tenderness :**
- In inflammation : typhoid & Brucellosis, TB (milliary) , SBE, infarction

7) **Pulsation:** splenic arterio-venous fistula

8) **Pitting sign = Mofti's sign :** in chronic myeloid leukemia
- دوس بال thumb على ال Spleen وخليك دايس شويه ثم امش بايدك على سطح ال spleen لو لقيت حفرة يبقى positive

9) **Notch** in the antro-medial border
- **Embryologically, the spleen is formed by fusion of spenules. The notch is formed at the site of their fusiom**

## ❖ Characters of liver:

- Intra-abdominal organ
- Right hypochondrium
- Moves up & down with respiration
- Hand can't reach the upper border
- Dull on percussion & it's dullness is continues with liver dullness

## ❖ Characters of spleen

- Intra-abdominal organ
- Left hypochondrium oblong in shape
- Moves up & down with respiration
- Hand **can't** reach the upper pole as you **can't** insinuate fingers between costal margin & the organ
- Dull on percussion & it's dullness is continues with Traub's area dullness " no band of resonance"
- Palpable notch in the antro-medial border (pathognomonic)
- **Does not** fill and can't be pushed in renal angle
- **No** ballottement "anterior ballottement only"

## ❖ Example of a FULL COMMENT on the liver:

- ○ Intra-abdominal swelling moves up & down with respiration

| | |
|---|---|
| → Right Lobe : In right hypochondrium, | → Left Lobe: may extend to epigastrium |
| → Felt … cm ( or finger breadth) below right costal margin in right mid clavicular line | → Felt … cm ( or finger breadth) below xiphisternum in the midline |

- ○ Not warm , not tender, not pulsatile
- ○ Firm in consistency, sharp border with smooth surface
- ○ Hand can't reach the upper border,
- ○ Dull on percussion & its dullness is continues with liver dullness

## ❖ Example of a FULL COMMENT on the spleen:

- ○ Intra-abdominal swelling moves up & down with respiration , oblong in shape in left hypochondrium extending to :
- → Felt … cm ( or finger breadth) below left costal margin in left mid clavicular line or
- → Huge i.e. crossing midline
- ○ Not warm , not tender, not pulsatile
- ○ Firm in consistency, sharp anterior border with smooth surface
- ○ Hand can't reach the upper pole as you can't insinuate fingers between costal margin & the organ
- ○ Dull on percussion & it's dullness is continues with Traub's area dullness " no band of resonance"
- ○ Palpable notch in the antro-medial border
- ○ Does not fill and can't be pushed in renal angle
- ○ No ballottement "anterior ballottement only"

## ❖ What are the causes of … ?

| | | Splenomegaly | Hepatosplenomegaly | Hepatomegaly |
|---|---|---|---|---|
| Infections | Bacterial | ▪ Paratyphoid<br>▪ Typhus<br>▪ T.B.<br>▪ Anthrax | ▪ Typhoid<br>▪ Brucellosis<br>▪ Syphilis<br>▪ abscess | ▪ Leptospirosis<br>▪ Pyogenic cholangitis<br>▪ Pyelophlebitis<br>▪ Portal pyemia |
| | Parasitic | ▪ Chronic malaria | ▪ Bilharziasis<br>▪ Hydatid cyst<br>▪ Kala azar | ▪ Amebic hepatitis<br>▪ Toxoplasmosis |
| | Viral | ▪ Psittacosis | ▪ Infectious mononucleosis | ▪ Viral hepatitis<br>▪ CMV<br>▪ Herpes simplex |
| Tumors | Benign | ▪ Lymphangioma | ▪ Hemangioma | |
| | Malignant | ▪ Fibrosarcoma<br>▪ Waldenstrom macroglobulinemia | ▪ Malignant lymphoma | ▪ Metastasis<br>▪ Hepatoma<br>▪ Holangioma |
| Metabolic | | ▪ Gaucher's disease<br>▪ Porphyria<br>▪ Rickets | ▪ Amyloidosis | ▪ Wilson's disease<br>▪ Hemochromatosis<br>▪ Fatty liver e.g. Reye's, DM<br>▪ Lipid storage disease<br>▪ Glycogen storage disease (Von Geirkes) |
| Blood | | ▪ Thrombocytopenia<br>▪ Thalassemia major | ▪ Chronic myeloid leukemia<br>▪ Hemolytic anemias<br>▪ Polycythemia rubra vera (PRV)<br>▪ Myelofibrosis | ▪ Megaloblastic anemia |
| Circulatory | | ▪ Portal vein occlusion :<br>▪ Tumour<br>▪ Thrombophlebitis | ▪ Portal hypertension | ▪ Chronic venous congestion<br>▪ Congestive heart failure<br>▪ Pericardial effusion<br>▪ Constrictive pericarditis |
| Congenital | | ▪ Cysts of spleen | | ▪ Reidel's lobe<br>▪ Polycystic disease |
| Collagen diseases | | | ▪ Felty's syndrome<br>▪ Still's disease<br>▪ Sarcoidosis | |

- **What are the causes of palpable liver without hepatomegaly ?**

○ Emphysema , subphrenic abscess & occasionally in normal persons

### ❖ What are the causes of tender splenomegaly ? TIBS

- Typhoid , typhus , TB (military)
- Infective endocarditis , Infectious mononucleosis , Infarction
- Brucellosis & Septicemia

### ❖ Causes of huge splenomegaly; spleen which crosses the midline :

- Portal hypertension (bilharziasis)
- Thalassemia major
- Chronic myeloid leukemia
- Chronic malaria
- Myeloproliferative disorders (Polycythaemia rubra vera & Myelofibrosis)
- Kala azar
- Gaucher's diseae
- Splenic sarcoma

### ❖ Causes of enlarged tender liver :

1. Malignancy
2. Infection : amebic hepatitis & abscess , viral hepatitis, pyogenic abscess
3. Congestion : heart failure , constrictive pericarditis

### ❖ Causes of nodular liver :

- Bilharzial with coarse nodularity
- Post necrotic cirrhosis (post hepatitis)
- Malignancy
- Syphilis Gumma (heparlobatum)
- Hydatid disease

### ❖ What are the causes of absent splenic notch ?

- Congenital, infarction, adhesions , tumors.

### ❖ What are the causes of multiple splenic notch ?

- Congenital , Multiple infarction of spleen

- **Why does enlarged spleen descend obliquely towards the umbilicus?**

- Towards right iliac fossa : due to presence of phrenicocolic ligament & it's axis .

- **When does enlarged spleen descend towards left iliac fossa?**

❖ Absent phrenicocolic ligament : embryological
❖ Resection : hemicolectomy
❖ Infiltrated phrenicocolic ligament : by malignancy
❖ Weak ligament : visceroptosis
❖ Huge spleen

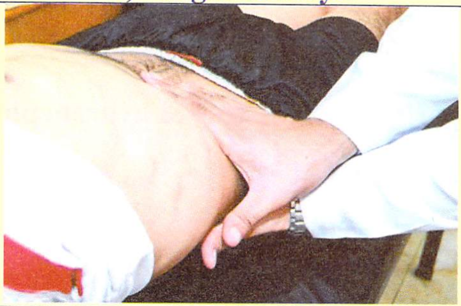
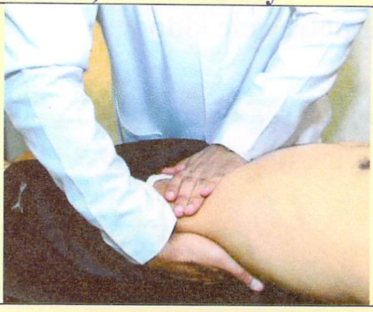
# Palpation of the Kidney

- ❖ **Definitions :**
- ❖ **Renal angle :** angle between last rib and lateral border of sacrospinalis muscle
  - والعيان جالس حدد أخر ribs ثم امشي معاها
- ❖ **Loin :** lies between last rib and iliac crest and from vertebral column to flank
- ❖ **Flank :** lateral aspect of the loin
- ❖ **Examination of the renal angle from back while the patient is sitting:**

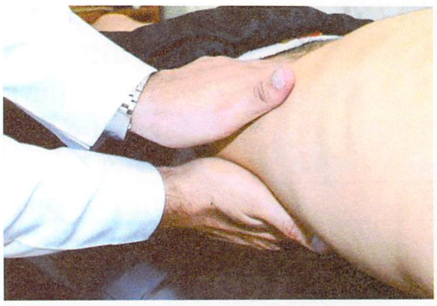
| Renal angle | Normally | Abnormally |
|---|---|---|
| ▪ Inspection | ▪ **Skin :** Normal | ▪ **Skin :** Ulcers, scars |
| | ▪ **Shape :concave** (Empty) | **Shape:**<br>▪ Fullness : swelling within renal capsule<br>▪ Bulge: swelling outside renal capsule |
| ▪ Palpation | ▪ No swelling | ▪ Swelling |
| | ▪ No tenderness | **Tenderness :**<br>▪ Thumb pressure test<br>▪ Costo-vertebral percussion<br>▪ Murphy's kidney punch |
| ▪ Percussion | ▪ Resonant | ▪ Dullness |
| ▪ Auscultation | ▪ Nothing | ▪ Bruit maybe heard in case of renal artery stenosis (Can be heard commonly anteriorly at transpyloric plane) |

❖ **Techniques:**

**A. Bimanual method**

| 1) Right kidney : | 2) Left kidney : |
|---|---|
|  |  |
| ○ The Right hand is placed anteriorly in the Right lumbar region while the Left hand is placed posteriorly in the right loin | ○ The Left hand is placed anteriorly in the left lumbar region while the Right hand is placed posteriorly in the left loin. |
| ○ بعد ما تحط ايديك , اضغط بايديك الإثنين بأقصى ما تستطيع<br>○ ثبت ايدك على كده ثم إجبر ال kidney انها تتحرك وذلك بأن تقول للعيان خد نفس جامد وخرجه , لو كبيرة هتحسها بتتحرك طالعه نازلة | |

**Palpation of the left kidney on the left side:**



- Move to the patient's left side.
- Place your right hand behind the patient in the left loin & your left hand anteriorly in the left lumbar region.
- The patient is asked to take deep breath while approximating both hands firmly

**B. Ballotement technique (only if kidney is enlarged):**

➢ Your hands at the same previous places, try to push the kidney with one hand & receive it with the other

- حط إيديك في الوضع السابق (من غير ما تضغط جامد)
- تخبط ال Kidney من فوق ← تنزل لتحت ← تطلع تخبط في ايديك تاني
- تخبط ال Kidney من تحت ← تطلع لفوق ← تنزل تخبط في إيديك تاني
- تسمى على اسم الايد اللي تحس:

← اليد اللي حست اللي فوق ← Anterior Ballotment

← اليد اللي حست اللي تحت ← Posterior Ballotment

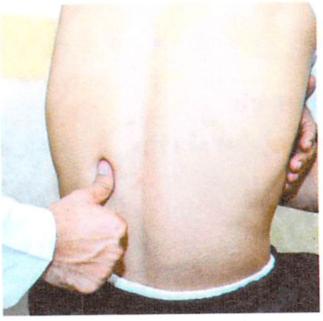
❖ **Old school : name according to the receiving hand (which feel) تسمى على اسم الايد اللي تحس :**

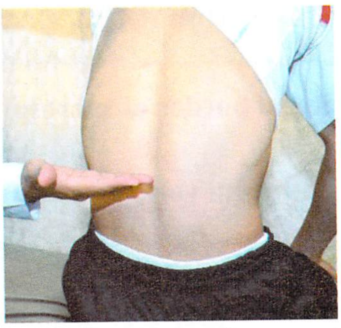
○ Kidney : ballot anteriorly & posteriorly , Spleen : ballot anteriorly but not posteriorly

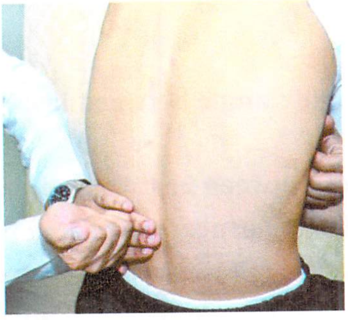
❖ **Recent school : ballottement if you feel both anterior & posterior**

○ Kidney : ballotable, Spleen : non ballotable

❖ N.B.:







- **Thumb pressure test:** apply pressure with the thumb to Costovertebral angle
- **Costovertebral percussion:** using ulnar aspect of the hand strike the patient flank.
- **Murphy's kidney punch :**

○ While the patient is sitting, examine for tenderness in the renal angle by using the ulnar border of the right fist, percuss over the dorsum of the left hand placed on the renal angle; with comparing both sides.

○ It may allow distinction between renal tenderness or tender abdominal wall or muscles of the back.

**❖ Comment on kidney:**

1) **Site:**
- In lumbar region

2) **Size :**
- **Causes of kidney swellings :** hypernephroma, polycystic kidney, perinephric abscess & hydronephrosis

3) **Border = edge :** Rounded

4) **Surface : bossy , irregular in malignancy**

5) **Consistency:**
  - Cystic in polycystic kidney

6) **Tenderness :**
- **Causes of tender renal swellins:** Pyelonephritis , renal infarction , perinephric abscess & hydronephrosis.

**❖ Can you palpate normal kidney ?**

- Yes, in :

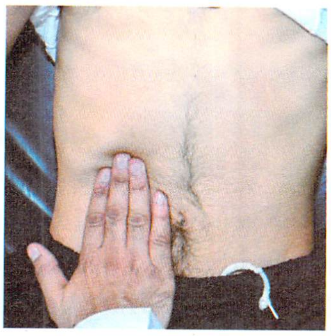
| | | |
|---|---|---|
| Very thin person | Lower pole only | Right kidney only |

**❖ What are the difference between spleen & kidney?**

▪ ليه قولت عليها Kidney مش Spleen أو ليه قولت عليه Spleen مش Kidney ؟

| | Spleen | Kidney |
|---|---|---|
| ▪ Notch | ○ Yes | ○ No |
| ▪ Anterior & Posterior Ballottement | ○ Non ballotable<br>○ Anterior only | ○ Ballotable<br>○ (anterior & posterior) |
| ▪ Anterior | ○ It is difficult to insinuate my hand between the swelling & the costal margin & if so I can't reach the upper border | ○ I can insinuate my hand between the swelling & the costal margin &<br>○ I can reach the upper border |
| ▪ Posterior | ○ Can't be pushed to renal angle | ○ Can be pushed to renal angle |
| ▪ Percussion | ○ Dull all through | ○ Band of resonance |
| ▪ Surface | ○ Smooth | ○ Bossy |
| ▪ Edge | ○ Sharp | ○ Rounded |

## Palpation of the Gall bladder



**❖ Normally GB cannot be felt, felt only if enlarged.**

**❖ Examination of GB is palpated for swelling & tenderness**

1. **Tenderness: Murphy's sign = acute cholecystitis :**

○ Compress your right fingertips below the right costal margin at the site of the GB & ask the patient to take deep inspiration & observe his face & breathing :

→ **Continue breathing** → normal

→ **Pain & can't continue inspiration** →cholecystitis

2. **Swelling :**

- **Site :** right hypochondrium
- **Technique :** single handed method by deep palpation as liver

❖ **Causes of GB swelling :**

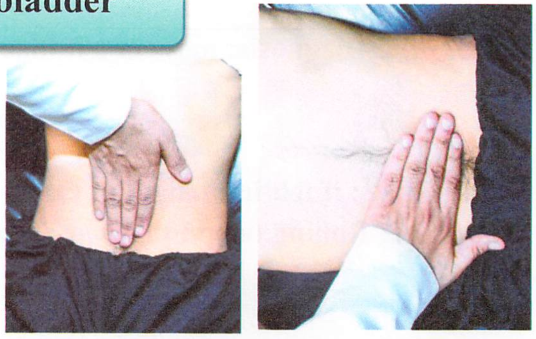
| ☞ Painless : | ☞ Painful: |
|---|---|
| ○ Tumour of GB<br>○ Cancer head of pancreas :<br>→ Courvoisier's sign:<br>▪ Palpable distended gall bladder in pancreatic cancer | ○ Cystic duct stone : mucocele , pyocele<br>○ Torsion<br>○ Pericholecystic abscess |

❖ **Characters of Gall Bladder swelling:**

| | |
|---|---|
| ○ Intra-abdominal organ in Right hypochondrium | ○ Moves with respiration (up & down) |
| ○ Pyriform or rounded in shape | ○ Cystic in consistency, hard in malignancy |
| ○ Inseparable from liver | ○ Dull on percussion & continuous with liver dullness |

❖ **Differential Diagnosis :** accessory hepatic lobe (Riedel's lobe)

## Palpation of the Urinary bladder



❖ **Normally UB is not palpable, felt only in retention**

❖ **Site:** middle line, never cross umbilicus

❖ **Technique :**

- Deep palpation from the umbilicus downwards by tips of fingers or by radial aspect of index finger of left hand

❖ **Characters of distended UB "retention of urine":**

| | |
|---|---|
| • Pelvi-abdominal swelling i.e. Has no lower border | • Immobile, in suprapubic region |
| • Oval in shape, smooth, firm, regular | • Positive fluid thrill |
| • Direct pressure on it produces a desire to micturate | • Dull on percussion |

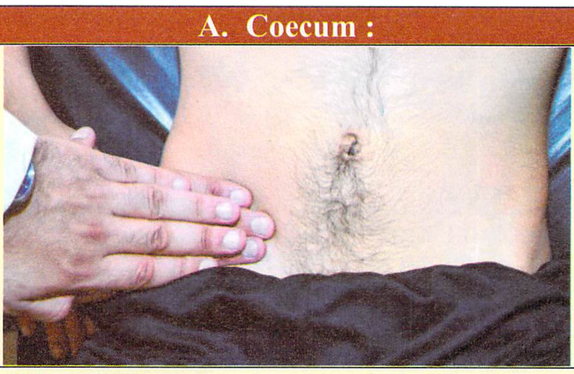
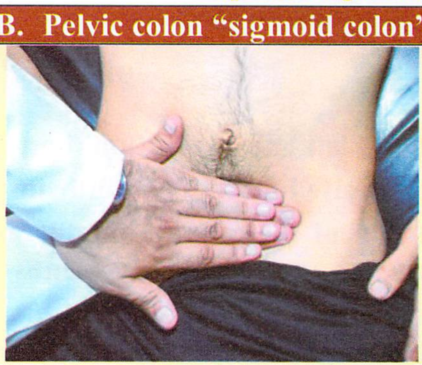
❖ **Differential Diagnosis:**

| | | |
|---|---|---|
| ○ Gravid uterus | ○ Ovarian cyst | ○ Any uterine mass e.g. mesenteric cyst |

## Palpation of the Colon

❖ Technique: rolling technique in 2 perpendicular directions (horizontal then vertical) :

- ○ حط إيدك الإثنين فوق بعض ( الإيد الشمال اللي فوق تدوس والإيد اليمين اللي تحت تحس)
- ○ اعمل rolling بال tips of fingers

| A. Coecum : | B. Pelvic colon "sigmoid colon" |
|---|---|
|  |  |
| ❖ **Site :** rolling technique in right iliac fossa<br>❖ **Normally** coecum may be felt<br>❖ **Characters of coecum :**<br>• Soft, rounded swelling with indistinct borders<br>❖ **Differential diagnosis :**<br>• Tumors of coecum | • **Site:** rolling technique in left iliac fossa<br>• **Normally** the pelvic colon may be palpable in thin patient or **irritable bowel syndrome (spastic colon)**<br>❖ **Characters of pelvic colon:**<br>• **Oblong sausage**-shaped (about 12 cm length)<br>• **Does not** move with respiration, parallel to the inguinal ligament<br>• Movable from **side to side** (but not vertically)<br>• **Gurgling** sensation on pressure<br>• **Differential Diagnosis; mass in left iliac fossa:**<br>- Commonest in children : iliac adenitis<br>- Commonest in middle age : Bilharzial pericolic mass<br>- Commonest in old age : cancer colon |

## Palpation of the Bilharzial pericolic mass

- ❖ **Site :** left iliac fossa, **Technique :** rolling technique
- ❖ **Characters :**

| | | |
|---|---|---|
| ○ Moves from side to side but not up down | ○ Oval in shape | ○ Firm, ± tender |

- ❖ **Pathogenesis :**
- ○ Heavy deposition of ova in the subserous area → Bilharzial reaction → large subserous mass (pericolic mass)
- ○ If deposition of ova submucous → Bilharzial reaction → intestinal polypi
- ❖ **Clinically** the mass **can't** be felt by per-rectal examination
- ❖ **No need for excision of the mass because:**

| | |
|---|---|
| ○ It is **not** precancerous | ○ Does **not** cause obstruction |

- ❖ **Investigated** mainly by endoscopy
- ❖ **Significance :** Associated with bilharzial **polyposis**:

| | | |
|---|---|---|
| ○ Ask the patient for bleeding per rectum | ○ Examine the patient for : toxic clubbing | ○ If so, treated by polypectomy |

- ❖ **Differential Diagnosis:** mass in left iliac fossa.

## Palpation of Para aortic Lymph node

- ❖ **Significance :** if felt in malignant cases, signifies preoperative inoperability
- ❖ **Technique: Rolling technique:** see chapter lymphadenopathy
  - ▪ حط إيدك الإثنين فوق بعض ( الإيد الشمال اللي فوق تدوس والإيد اليمين اللي تحت تحس)
  - ▪ اعمل rolling بال tips of fingers

📖 **Para-aortic LN**

- ○ **Site : :** umbilical & epigastric regions along lateral border of aorta i.e. on the left of a line extending from xiphisternum to umbilicus
- ○ **Characters :** site, size , shape , ….
- ○ **Significance :** if felt in malignant cases, signifies preoperative inoperability

## Palpation of the abdominal aorta

- ❖ **Technique:** by deep palpation using two handed method to the midline above & lateral to umbilicus.

## Palpation of the ascites: Transmitted thrill (fluid thrill) in tense ascites; see later

## Per-rectal (PR) examination

1. **Patient position : left lateral position (best),** Knee-elbow position (maybe)
2. **Inspection :** separate buttocks carefully inspect perianal area and anus for :

| | | |
|---|---|---|
| ▪ Pruritis ani (signs of inflammation) | ▪ External piles or fistula or pilonidal sinus | ▪ Anal warts, fissure,<br>▪ Ask patient to bear down for prolapse |

3. **Palpation :**

- ☞ **Put a lubricant on gloved index finger of Right hand**
- ☞ **Ask patient to relax & introduce your finger gently& Rotate finger 360° in anal canal for :**
- • Thickening or irregularity in wall
- • Tone of anal musculature & sphincters
- • Then pass finger into rectum with left hand placed on patient Right hip & latter in suprapubic position :
- ☞ **On withdrawing finger look at it for blood, mucous, pus**

4. **Value of PR :** to help in diagnosis of the following conditions :

| | |
|---|---|
| 1. **Alimentary problems e.g.**<br>• Anal irritation or pain , tenesmus or rectal pain | 2. **Genito - urinary problems e.g.**<br>• Hematospermia & epididymoorchitis<br>• Gynecological examination in virgins |
| 3. **Miscellaneous problems :**<br>• In the search for a cause of backache, root pains in legs or diffuse bone pains | |

## III. Percussion

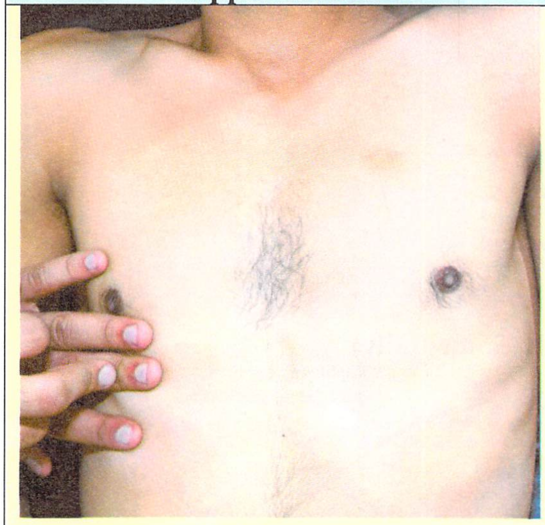
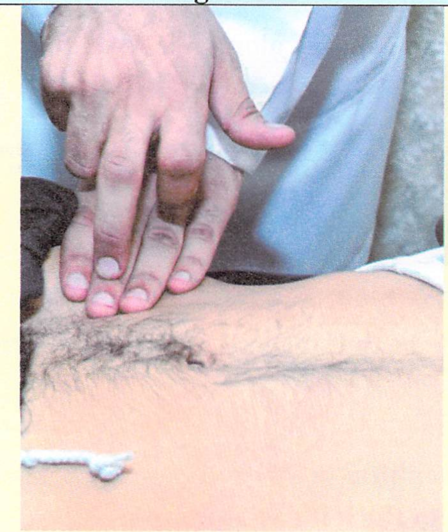
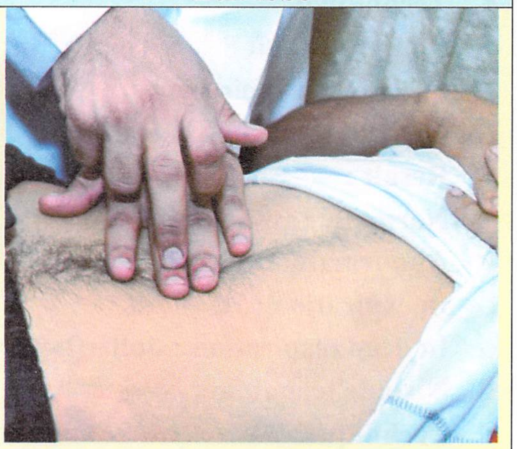
❖ **Type :** percussion of abdomen by light percussion except upper border of liver by heavy percussion

❖ **Values :**

- Defining boundaries of abdominal organs & masses
- Detection of ascites

## Percussion of the liver

| ❖ Border | A. Upper border | B. Lower border |
|---|---|---|
| ❖ Aim = Value = importance of the border: | ○ Liver span: see below<br>○ To differentiate ptosed liver (emphysema) from enlarged liver | ○ Shrunken liver<br>○ Soft liver<br>○ Tenderness<br>○ Rigid abdomen |
| ❖ Type of percussion | ○ Heavy percussion confirmed by tidal percussion | ○ Light percussion |
| ❖ line | ○ Right MCL | ○ **Right lobe :** in the RT MCL stating from right iliac fossa upwards<br>○ **Left lobe:** in the midline, starting from just above the umbilicus upwards |
| ❖ In percussion of the lower border percuss upwards till reaching dullness of the liver, When you reach it, **continue percussion** , till you reach the upper border, to prove that is dull on percussion and it's dullness continuous with normal hepatic dullness | | |

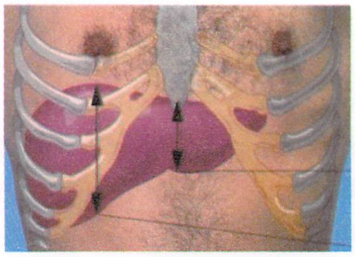
| By heavy percussion: | By light percussion: lower border of the : | |
|---|---|---|
| Upper border | Right lobe | Left lobe |
|  |  |  |

**❖ To determine the liver span:**

→ **Definition : the vertical distance in cm between the dullness of the upper & lower border of liver in MCL:**

A. Determine the **upper border of liver dullness by** heavy percussion confirmed by tidal percussion

B. Determine the **lower border of liver dullness by** light percussion or by palpation.



→ **Results :**

- **Normal span:** 8-16 cm in the right MCL.

☠ Normal liver span in midline : 4-8 cm, but can't be detected clinically

- **Abnormalities:**

○ The span is increased in case of hepatomegaly.

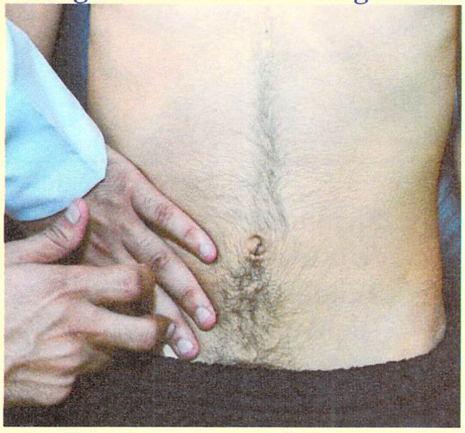
○ The span is decreased in case of shrunken liver ( liver cirrhosis ).

○ The upper border of liver dullness is displaced downwards in case of low diaphragm due to COPD

# Percussion of the spleen

## I. Palpable splenomegaly

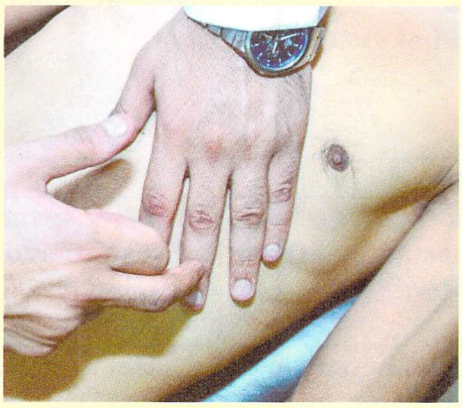
- **Percuss along the axis of its enlargement:**



- ○ From right iliac fossa to the left hypochondrium coming with your finger parallel to the left costal margin going towards the midpoint of the left costal margin
- When you reach the dullness of the spleen, **continue percussion** , till you reach the upper border, to prove that is dull on percussion and it's dullness continuous with normal splenic dullness

## II. Impalpable splenomegaly

**A. Percussion of Traube's area:**



- ▪ From the center of Traube's area to left mid axillary line at the level of 9th intercostal space:
- ○ If you found **no** dullness till MAL→ **no** splenomegaly
- ○ if you found **dullness** before MAL → **splenomegaly**

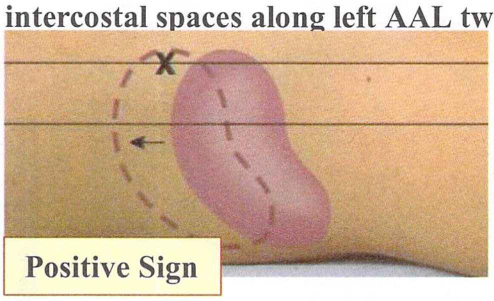
**B. Castell's technique**

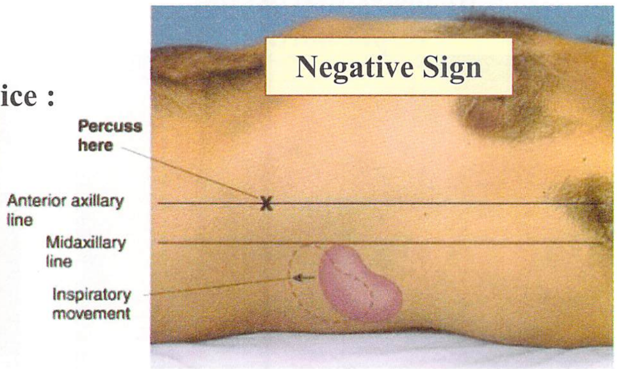
**C. Nixon's technique**

❖ **Other methods to detect impalpable splenomegaly (splenomegaly less than 3 time its normal size):**

**A. Castell's technique = splenic percussion sign: للإمتيااااز**

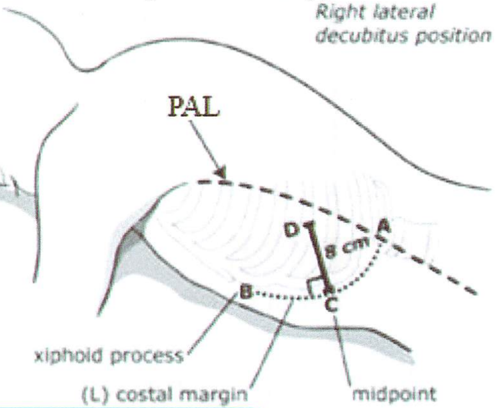
- **Technique:**
  - ☞ Percuss left 8th , 9th or 10th intercostal spaces along left AAL twice :
  - ○ Once in expiration
  - ○ Once in deep inspiration
- **Result :**
- ☞ **Normally :** resonant
- ☞ **Abnormally :** splenomegaly
- ○ In expiration : resonant
- ○ In deep inspiration : dull =(lower pole of the spleen is displaced inferiorly & medially)


Positive Sign

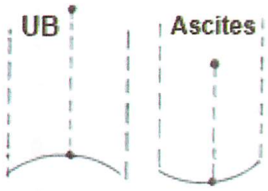

Negative Sign

**B. Nixon's technique: لأوااائل الدفعة**

- **Technique:**
  - ☞ The patient lies in right lateral decubitus
  - ☞ Percuss with your finger parallel to the left costal margin from the PAL to the midpoint of the left costal margin crossing the splenic dullness till it disappears
- **Result:**
  - ☞ **Normally :** 6-8 cm
  - ☞ **Abnormally**: splenomegaly : > 8 cm



# Percussion of Urinary bladder



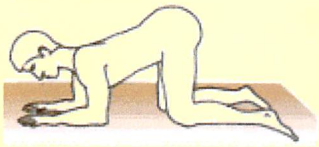
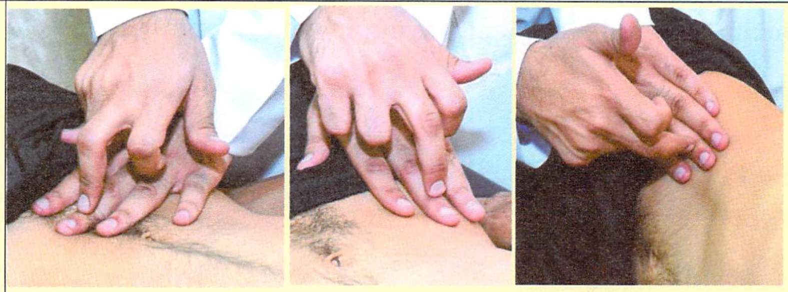
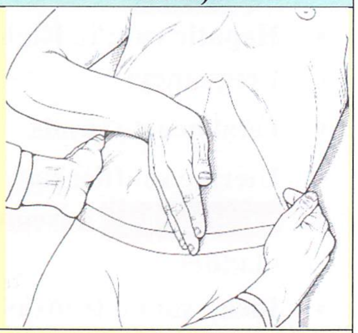
- **Aim :** to DD it from ascites
- **Technique :** percuss in 3 parallel lines beginning from the umbilicus:
- ☞ **Midline :** horizontal finger , percussing from just below the umbilicus downwards
- ☞ **Right flank :** horizontal finger , percussing from right costal margin downwards
- ☞ **Left flank :** horizontal finger , percussing from left costal margin downwards
- **Result:**

| | | | |
|---|---|---|---|
| UB characterized by : | Peripheral resonance | Central dullness | Inverted U shaped dullness |
| Ascites characterized by : | Dull flanks | Central resonance | U shaped dullness |

## Percussion of the Kidney

- **Back :** renal angle is resonant
- **Front:** percuss from the corresponding iliac fossa, while your finger is horizontal over the abdomen, percuss upwards , when you reach the dullness of the kidney swelling , continue percussion upwards till the upper border, band of resonance of the colon will be detected

## Percussion of Ascites

| ❖ Percussion of ascites | | |
|---|---|---|
| **Mild** | **Moderate** | **Massive** |
| 0.5 – 1 litre | 1.5 – 3 litre | > 3 litre |
| ❖ N.B.:<br>○ Minimal ascites less than 500 cc is detected by ultrasonography<br>○ Tense ascites depends on the amount & rate of accumulation ( > 3000 cc ) | | |
| ❖ Type | | |
| Mild ascites | Moderate ascites | Tense ascites |
| ❖ Idea: | | |
| ▪ The abdomen becomes horizontal, the umbilicus is the most dependent part & the fluid collects around it | ▪ Free fluid tends to gravitate , while loops of intestine float upon | ▪ Amount makes the abdomen under tension |
| ❖ Technique: | | |
| **Percussion in Knee elbow position** | **Shifting dullness** | **Transmitted thrill (fluid thrill)** |
|  |  |  |
| 1. خبط على ال Umbilicus والعيان نايم supine هتلاقيها resonant<br>2. قول للعيان اسجد ثم هم على كوعك (knee-elbow) وخبط على ال umbilicus مرة تانيه هتلاقيها بقت dull | ▪ إبدأ من ال umbilicus نازلاً لأسفل حتى تصل لل dullness علشان نجيب ال upper border<br>▪ اطلع فوق سنة واقلب اتجاه ايدك خليها عمودية واعمل percussion للناحية اليمين او الشمال<br>▪ ثم خبط حتى تصل لل dullness<br>▪ ثبت ايدك في هذا المكان وخلي العيان ينام على جنبه التاني وانتظر دقيقة ثم خبط في نفس المكان مرة أخرى<br>▪ لو لقيتها اصبحت resonant يبقى في ascites<br>▪ ثم كرر نفس الشيئ على الناحية الأخرى علشان تتأكد ان ده free fluid مش encysted | 1. حط ايد العيان بسيفها على منتصف البطن وقول له دوس جامد وفائدتها انك:<br>▪ To damp an impulse which may be transmitted through fat of abdominal wall<br>▪ Make the abdomen more tense<br>2. ثم اعمل flickering بايد وحس بال palm بتاع بالايد التانية |
| ❖ N.B.: | | |
| • How to increase the accuracy of detection of minimal ascites using stethoscope?<br>○ by puddle sign | ❖ Percussion of upper border of ascites from umbilicus or below the level of dullness of organomegaly<br>❖ Variations of technique :<br>○ Percuss the upper border in 3 parallel → U shaped<br>○ Some doctors do not perform the 1st step (upper border)<br>○ Shifting dullness or shifting resonance<br>❖ Causes of unilateral shifting dullness:<br>• Ovarian cyst, intestinal obstruction & encysted ascites | • Not specific for ascites may be found in ovarian cyst & huge hydatid cyst |

## IV. Auscultation

1. **Pulmonary area :** for pulmonary hypertension (Billharzial cor-pulmonale)
2. **Succussion splash:** to diagnose gastric stasis as in pyloric obstruction

❖ **Value of Succussion splash : Hydropneumothorax & Gastric stasis as in pyloric obstruction**

3. **Vascular sounds:**

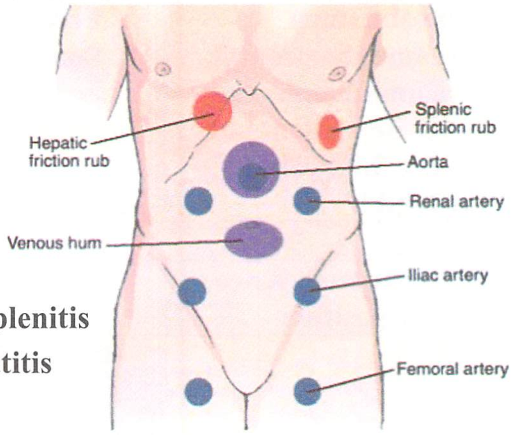
| | Arterial bruit | Venous hum |
|---|---|---|
| Timing | Only during systole | Continuous "systolic & diastolic" |
| Character | High pitched | Low pitched |
| Heard By | Diaphragm | Cone |
| Heard at | ▪ Renal angle<br>▪ Trans-pyloric line | ▪ Epigastric area; between xiphisternum & umbilicus |
| Variation with inspiration | No change | Increased with inspiration |
| Cause | Renal artery stenosis | Portal hypertension "Kenawy sign |

4. **Intestinal sounds (borborygmi):**

❖ Start abdominal examination by auscultation of intestinal sounds **before palpation,** because excessive maneuver in abdomen leads to irritation of intestine & increases rate of sounds

- **Character:** low pitched gargles of variable frequency (5-30 /min)
- **Heard by** cone, **at :** right & lower to the umbilicus
- **Increased in :** diarrhea & early intestinal obstruction
- **Absent in :** paralytic ileus & peritonitis

○ Auscultate for peristalsis bowel sounds for at least 3 minutes before deciding that they are absent



5. **Friction rubs :**

- **Splenic rub :** in Left hypochondrium, due to splenic infarction & perisplenitis
- **Hepatic rub:** in Right hypochodrium, due to hepatic tumor & perihepatitis

6. **Pregnancy:**

- Fetal heart sounds
- Uterine soufflé: flow of blood in uterine artery.

7. **Scratch test : auscultatory method = Macleod method:** for soft hepatomegaly or splenomegaly or urinary bladder

- **Idea :** sound transmitted better in solid media
- **Technique for liver as an example:**

❖ **How to detect soft hepatomegaly ?**
✌ **Percussion of lower border**
✌ **Scratch method**

- حط السماعة على ال right costal margin
- خربش بإيدك أو بقلم في خطوط متوازية صاعداً لأعلى
- لما تلاقي الصوت اللي انته سامعه بالسماعة علىّ فجأة , حط نقطة ثم وصل هذه النقط هو ده ال lower border بتاع ال liver

| | Position of stethoscope | Scratching movement | Increased intensity of sound detects |
|---|---|---|---|
| Liver | ▪ Xiphisternum or above right costal margin | ▪ From right lower quadrant towards the right costal margin along MCL | ▪ Lower border of liver |
| Spleen | ▪ Above left costal margin | ▪ From left lower quadrant towards the left costal margin along MCL | ▪ Lower border of spleen |
| Urinary bladder | ▪ Supra-pubic area | ▪ Along the vertical midline from the umbilicus downward | ▪ Upper edge of the urinary bladder |

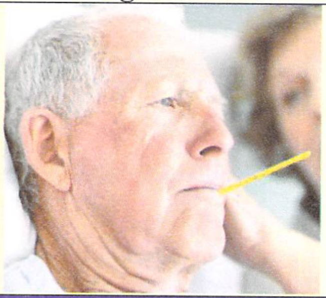
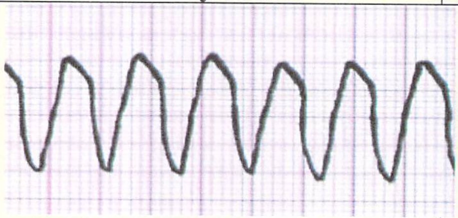
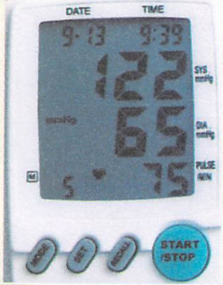
8. **Puddle sign:** for detection of **minimal** ascites :

- The patient lies **prone** for 5 minutes
- The patient lies in the **knee-elbow** position
- Place the stethoscope on the most dependent part of the abdomen (Place stethoscope **at umbilicus**)
- The nearby **flank is percussed** repeatedly by light flicking of constant intensity
- Gradually move the **stethoscope towards** the flank **opposite** the percussion
- An **increase** in the intensity of the sound hear by the stethoscope indicated that there is a **fluid level**

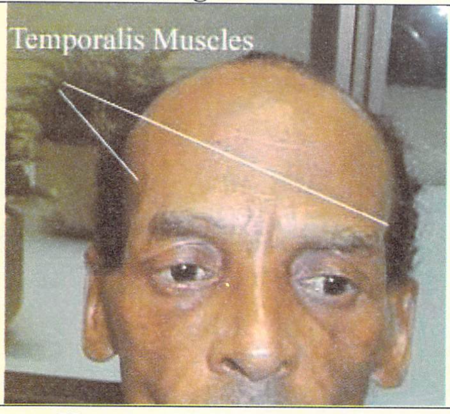
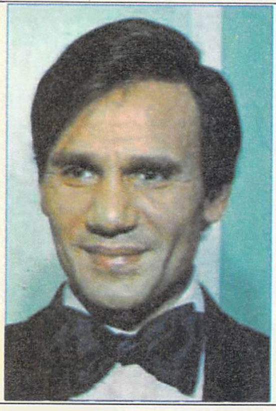
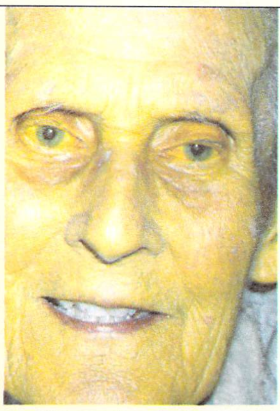
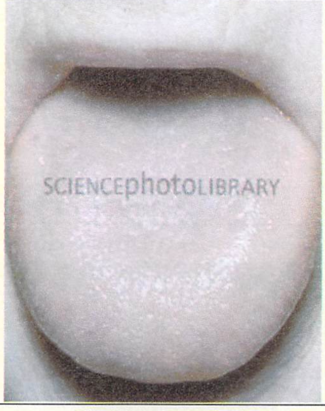
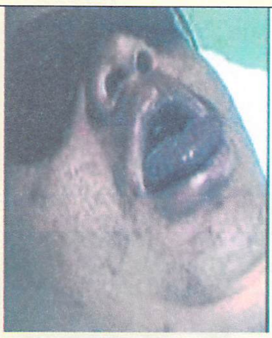
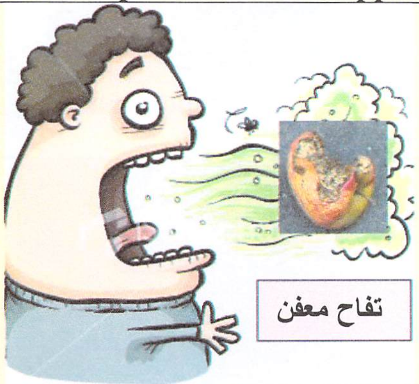
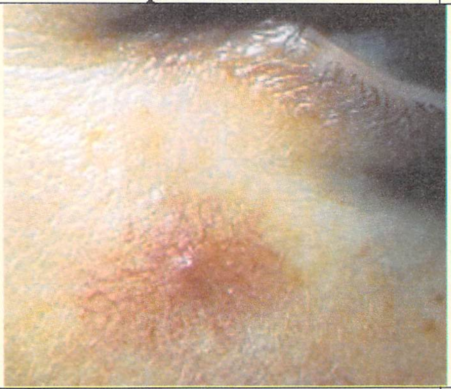
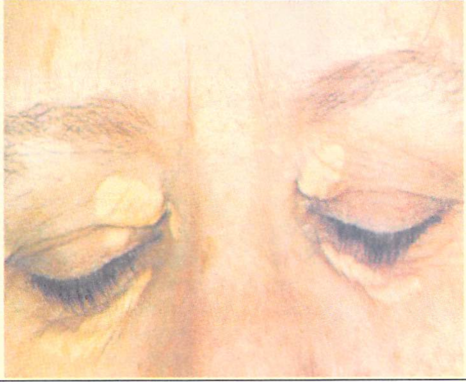
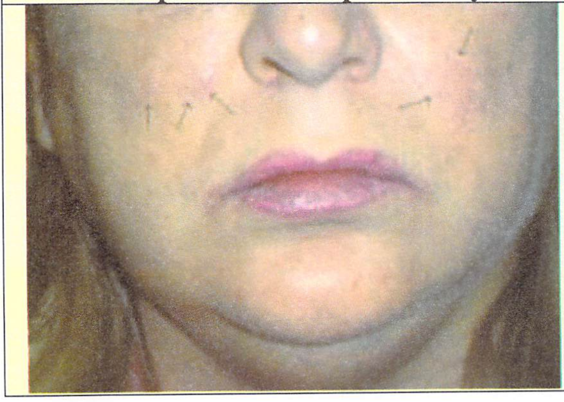
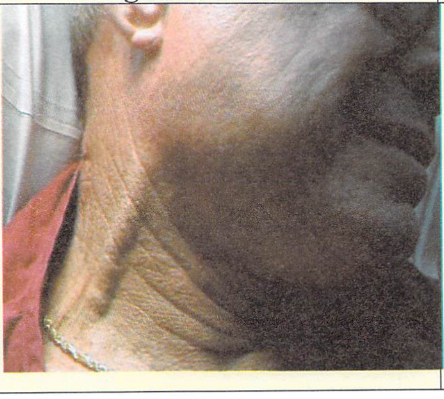
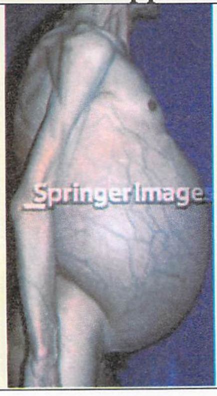
# ❖ Revision : Signs of Liver cell failure أهم درس

## Cellular decompensating

### ❖ Vital signs

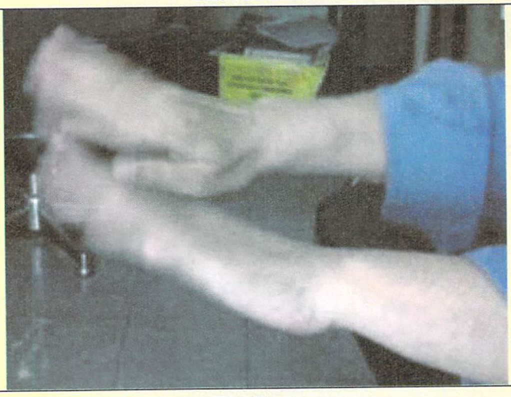
| Low grade fever | Tachycardia | Decrease diastolic pressure |
|---|---|---|
|  |  |   DATE<br>TIME<br>9·13<br>9:39<br>122<br>65<br>75<br>START /STOP |

### ❖ Head & neck

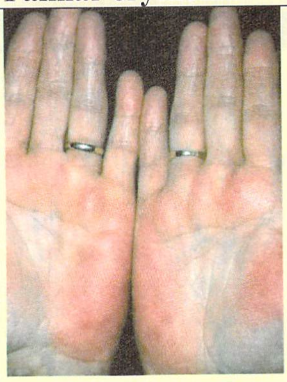
| Wasting of muscles | Hepatic encephalopathy (SAD) | Fine silky hair ادعو له بالرحمة لوسمحتم |
|---|---|---|
|   Temporalis Muscles | |  |
| **Hepatocellular Jaundice** | **Pallor in conjunctiva , lips, tongue** | **Central cyanosis in tongue** |
|  |   SCIENCEphotoLIBRARY |  |
| **Foetur hepaticus "rotten apple"** | **Spider naevi** | **Xanthelasma** |
|  |  |  |
| **Endemic parotitis + Paper money skin** | **Congested neck veins** | **Spider man appearance** |
|  |  |   SpringerImages |

## Upper & Lower limbs

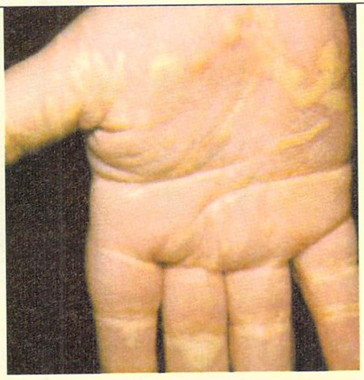
**Asterixis**



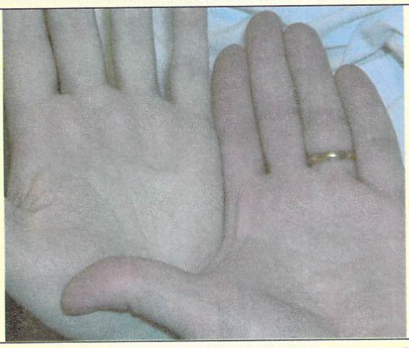
**Palmar erythema**



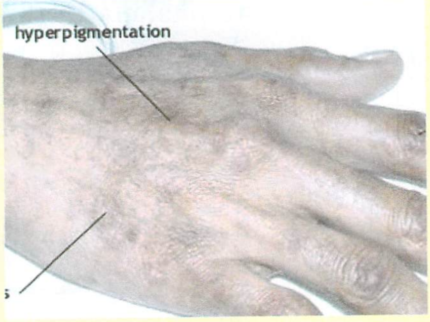
**Palmar or tendon xanthomata**



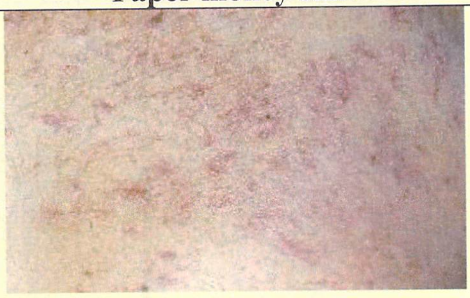
**Pallor**



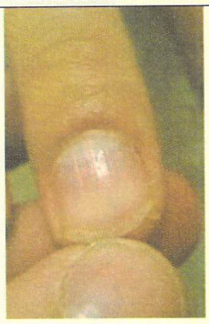
**Pigmentation**



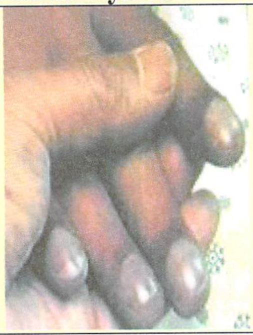
**Paper money skin**



**Capillary pulsation & Water hammer pulse**

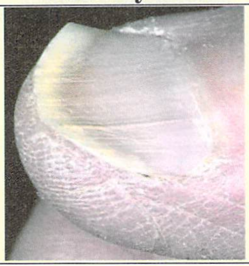


**Cyanosis & Cyanotic clubbing**

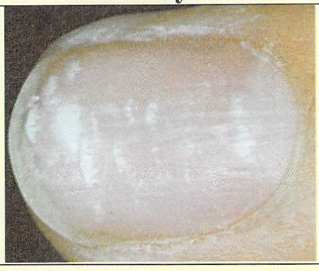


### Changes in Nail :

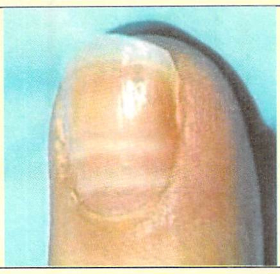
**Koilonychia**



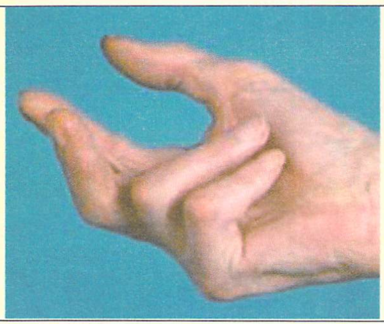
**Leukonychia**



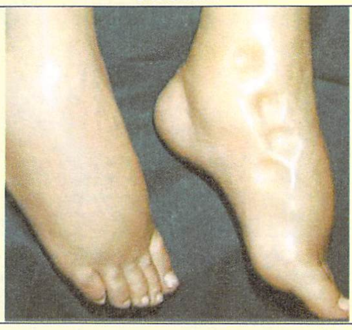
**Muehrcke's nails**



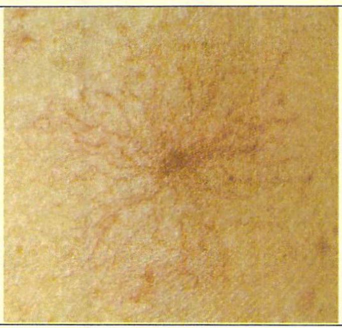
**Dupuytren Contracture**



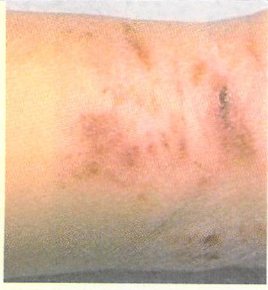
**Bilateral pitting lower limb edema**



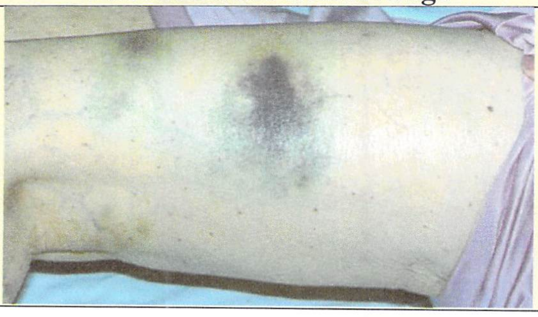
**Spider naevi**



**Scratch Marks**

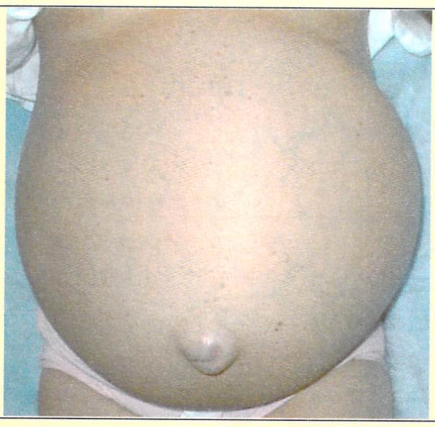


**Subcutanoues hemorrhage**

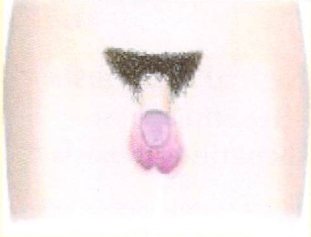


## ❖ Local examination

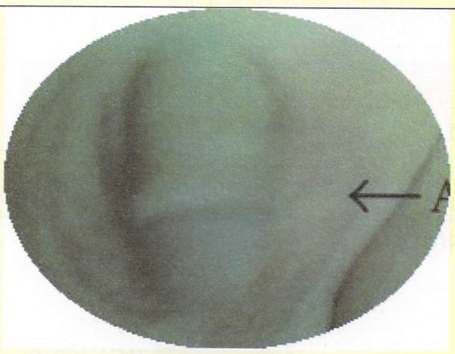
**Ascites**



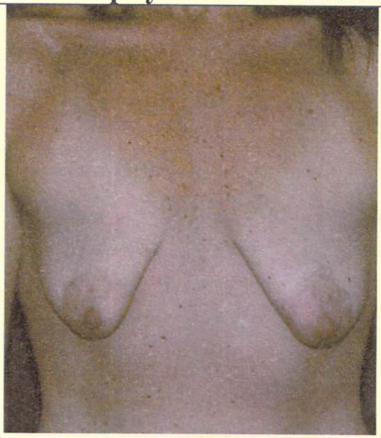
**Feminine distribution of supra-pubic hair**



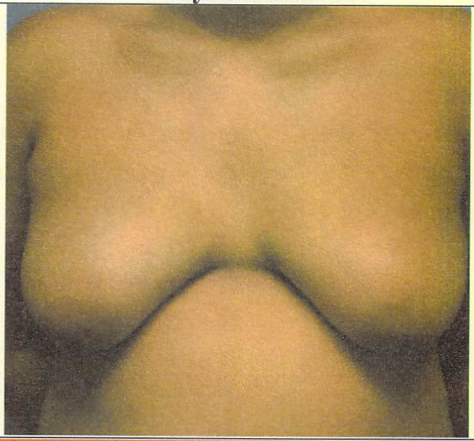
**Testicular atrophy**



**Atrophy of female breast**

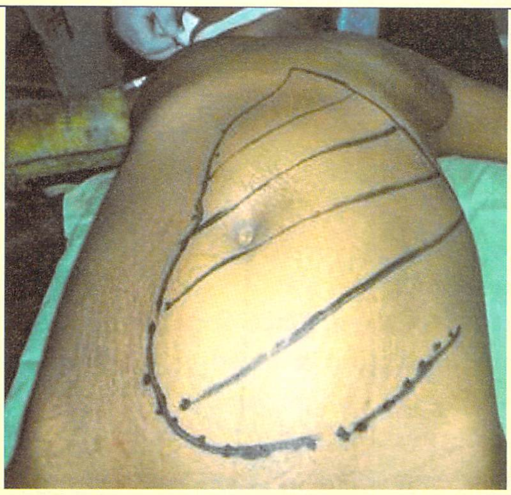


**Gynecomastia**

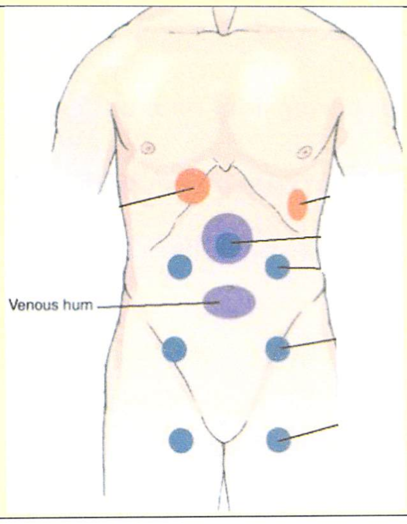


## Vascular decompensating : portal hypertension

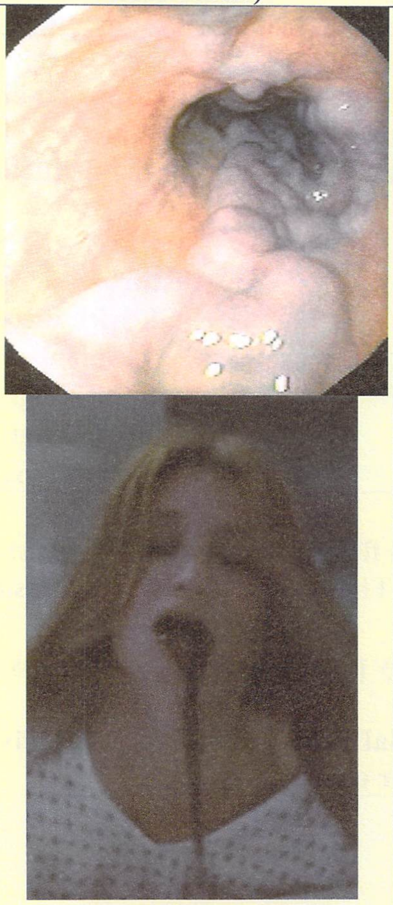
**Splenomegaly is the surest sign of portal hypertension = congestive splenomegaly**



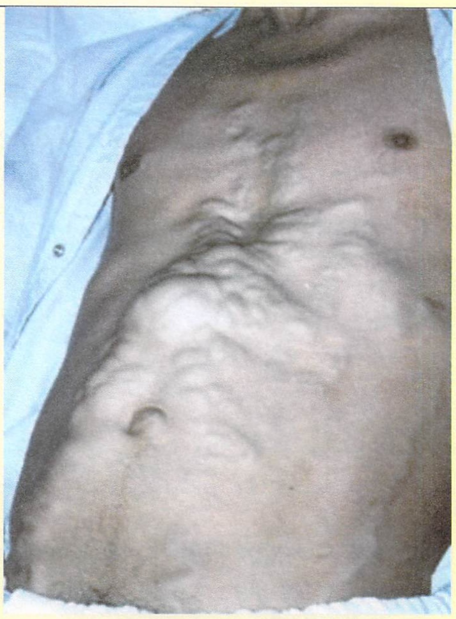
**Venous hum**



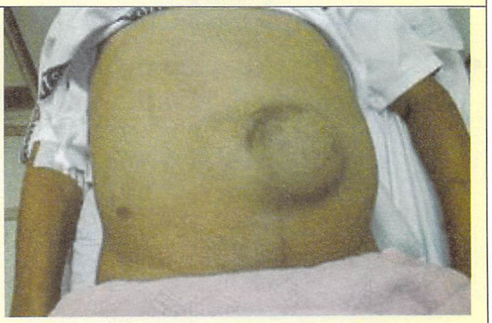
**Bleeding varices : Oesophageal varices (history of hematemesis)**



**Porto-systemic anastomosis “caput medusa “**



**Ascites**



# Diagnosis Of Abdominal Case

## ❖ Etiological & pathological diagnosis = SCHEME of the abdomen

| Case | 1) Malignancy | 2) Hepatitis "post hepatitic cirrhosis " | 3) Bilharziasis "pure ß fibrosis " | 4) Mixed " mixed ß & hepatitis cirrhosis " |
|---|---|---|---|---|
| History | • Constitutional symptoms :<br>○ Marked<br>○ Short duration<br>○ Most of them present. | • History of blood transfusion<br>• Fever<br>• Jaundice<br>• Dark urine & pale stool<br>• Admission to fever hospital | • ß dysentery<br>• Investigation for ß " stool analysis"<br>• Received treatment<br>• Anti ß drugs<br>• Contact with channel water | • Hepatitis & Bilharziasis |
| General examination | • Cachexia = emaciation + pallor | • Signs of LCF | • No LCF | • Signs of LCF |
| Local examination | • Data of malignancy :<br>○ Hard consistency<br>○ Irregular surface<br>○ Rounded edge<br>○ tender | • Data of cirrhosis :<br>○ Firm in consistency<br>○ Smooth or Nodular surface<br>○ Sharp edge<br>○ Shrunken liver | • Data of fibrosis :<br>○ Firm in consistency<br>○ Smooth surface<br>○ Sharp edge<br>○ Shrunken liver | • Data of cirrhosis. |
| Investigations | • Tumor marker : ↑ alpha fetoprotein<br>• Biopsy | • Hepatitis markers | • Stool analysis : viable ova " hatching test" | • Hepatitis markers & Stool analysis |

## ❖ Anatomical diagnosis by clinical examination & investigation (the best is Ultra-sound):

- Splenomegaly
- Hepatosplenomegaly
- Hepatomegaly

## ❖ Functional diagnosis by clinical examination & investigation:

**A. Compensation :**

- Compensated
- Decompensated :
  - Cellular decompensation: see before
  - Vascular decompensation: see before

**B. Complications & how to suspect clinically :**

- **Hepatic encephalopathy (SAD):**
  - Sleep disturbances (somnolence & inverted sleep rhythm),
  - Speech disturbances (slurred speech or monotonus speech)
  - Apathy, Asterixis
  - Disturbed personality & behavior
  - DCL with disorientation for time, place & person.
- **Hypersplenism:** anemia, infection & bleeding tendency
- **Peritonitis "spontaneous bacterial peritonitis" :** fever, abdominal pain & tenderness, refractory ascites
- **Malignancy:** see before.

E.g.

- This is a case of bilharzial periportal fibrosis combined with post-hepatic cirrhosis with shrunken liver, enlarged spleen & moderate ascites. The condition is decompensated both cellular & vascular & not complicated
- A case of hepatosplenomegaly, mostly post hepatitis liver cirrhosis with portal hypertension, no manifestation of liver cell failure
- A case of splenomegaly for differential diagnosis mostly due to liver cirrhosis with shrunken liver with portal hypertension & manifestation of liver cell failure

# Summary Of Abdominal Examination

## I. General examination:

| | | | |
|---|---|---|---|
| • Vital signs | • General overview | • Systemic overview | • Other systems except that of local exam |

- Local examination : Abdominal

## II. Inspection of the Abdomen = Anterior + Back

### ☞ Anterior aspect:

✌ **2 General :**

1. Contour of the abdomen
2. Movement with respiration

❖ **7 in Midline**

1. Sub costal angle
2. Divarication of recti
3. Umbilicus (5 S + 2 D)
4. Epigastric pulsation
5. Visible peristalsis
6. Supra-pubic hair
7. External genitalia

❖ **8 on Sides:**

| 4 : | | 4 : |
|---|---|---|
| 1. Breast<br>2. Dilated vein<br>3. Edema of abdominal wall<br>4. Hernia | | 5. Scars<br>6. Scratch marks<br>7. Striae<br>8. Subcutaneous hemorrhage |

### ☞ Posterior aspect : back of the patient, breast, knee & scrotum

## III. Palpation:

A. Superficial palpation : tenderness , guarding , ... etc.

B. Deep palpation :

| | | |
|---|---|---|
| 1. Liver for:<br>▪ Lower border of right in MCL<br>▪ Lower border of left lobe in ML | 2. Spleen | 3. Kidney |
| 4. Gall bladder | 5. Urinary bladder | 6. Colon |
| 7. Para-aortic LN & mesenteric LN | 8. Abdominal aorta | 9. Ascites (transmitted thrill) |
| 10. Per-rectal examination (PR) | | |

## IV. Percussion:

| | | |
|---|---|---|
| 1. Liver :<br>▪ Upper border in MCL<br>▪ Lower border for right lobe in MCL<br>▪ Lower border for left lobe in ML | 2. Spleen | Urinary bladder |
| 3. Kidney | 4. Ascites: Knee – elbow, shifting dullness | |

## V. Auscultation

| | | |
|---|---|---|
| 1. Succussion splash | 2. Vascular sounds | 3. Intestinal sounds |
| 4. Friction rub | 5. Scratch test for soft organomegaly | 6. Puddle sign for minimal ascites |

# INVESTIGATIONS OF ABDOMINAL CASE

## I. Non-Imaging:

### 1) Liver function tests

**A. Liver enzymes :**

- **Transaminases :**
  - Serum glutamic **P**yruvate transaminase (SGPT) = **AL**anin transaminase (ALT), this increases in acute liver disease & s**P**ecific for **L**iver
  - Serum glutamic **O**xaloacetate transaminase (SGOT) = aspar**T**ate transaminase (AST) this increases in chronic liver disease & n**OT** specific for liver, present in heart as well.
- **Gama glutamly transferase (GGT)** : specific for liver disease e.g. alcoholic hepatitis
- **5-nucletidase :** increases in obstructive jaundice
- **Alkaline phosphatase :** increases in liver & bone disease

**B. Bilirubin :**

- **Total :** Normal : 0.2 – 1 mg%, increases in all types of jaundice
- **Direct:** Normal : 0.2 mg%, increases mainly in obstructive jaundice
- **Indirect:** Normal: 0.8 mg%, increases mainly in hemolytic jaundice

**C. Plasma proteins :**

- **Normal Values:**
  - Total protein : normal : 7 – 9 gm %
  - Albumin : normal: 4-5gm%
  - Globulin : normal : 2- 3 gm%
  - A/G ratio : normal 2:1
- **Abnormally:**

| | Acute liver disease | Chronic liver disease |
|---|---|---|
| e.g. | Viral hepatitis | Liver cirrhosis |
| Albumin | Not affected (Long life span) | ↓ |
| Globulin | ↑ | ↑ |
| A/G ration | Normal | Decreased or even reversed. |

**D. Alpha fetoprotein:** increases in hepatoma

**E. Hepatitis markers**

**F. Prothrombin :**

- **Time :** Normal = 12-14 sec , increases in chronic liver disease
- **Concentration :** Normal 100% , decreases in chronic liver disease

### 2) Serum fluid analysis for ascites for TB, malignant peritonitis , spontaneous bacterial peritonitis

### 3) Stool & Urine analysis : for viable Bilharzial ova

### 4) CBC:

- Pancytopenia due to hypersplenism
- Hypochromic microcytic anemia due to bleeding varices

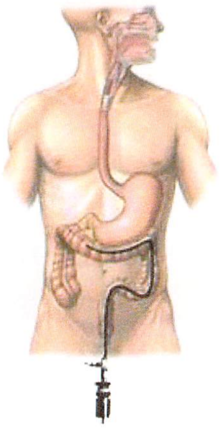
### 5) ECG: Bilharzial cor-pulmonal

### 6) EEG: encephalopathy

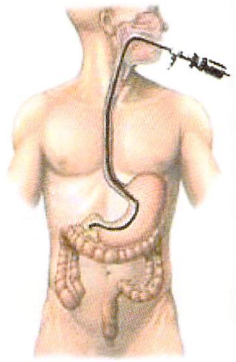
### 7) Endoscopy :

- **Upper GIT endoscopy : to detect :**
  - Esophageal varices
  - Peptic ulcer, fundal varcies
- **Lower GIT endoscopy to detect :**
  - Piles
  - Bilharzial ulcers & polypi

Lower endoscopy



Upper endoscopy



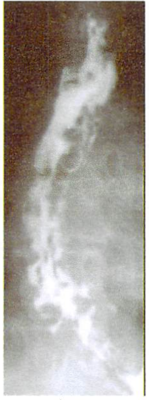
## II. Imaging:

1. **Ultrasonography (US)to detect :**

A. **If used alone :**
- Ascites , amount , free or encysted
- Liver, spleen, renal, gall bladder abnormality
- Portal circulation : diameter of portal vein ( normally varies from 7 → 14 mm) & portal blood flow (Doppler)

B. **US guided aspiration**

C. **US guided biopsy**



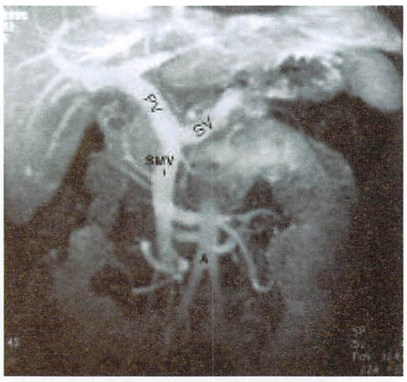
2. **Contrast X-ray:**
- **Barium swallow :**oesophageal varices→→→
- **Barium meal :** peptic ulcer
- **Barium enema :** Bilharzial polypi

3. **CT & MRI abdomen to detect malignancy.**

4. **Catheter:**

  A. **Portal venography :**
  - Before shunt operations to ensure patency
  - Was invasive but now located by digital subtraction angiography (DSA)

  B. **Portal manometry :**
  - Pre-operative
  - Intra-operative
  - Normal portal pressure = 7-11 mmHg



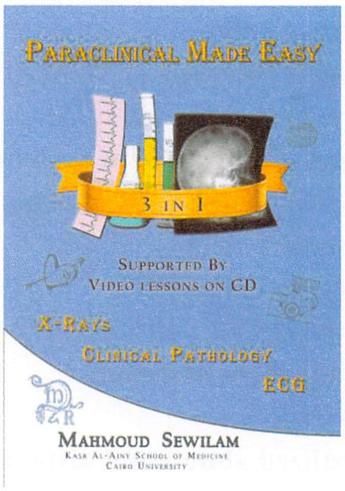
5. **Liver biopsy:**

A. **Precautions :**
  - Vitamin K parenteral 5 days before biopsy
  - PT concentration 100%

B. **Types**
  - Open : wedge biopsy
  - Needle biopsy : US or CT guided biopsy
  - Trucut (core of tissue)
  - Chiba needle

C. **Indications:**
  - Tumour (benign , malignant)
  - Chronic hepatitis (active, persistent)

D. **Contraindications:**
- Uncooperative patient
- Bleeding disorder
- Difficulty in determining liver location, as with ascites
- Infection of skin, pleura, right lower lung or peritoneum overlying the liver
- Suspected liver abscess or vascular lesion
- Severe extra-hepatic obstruction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Kasr Al-Ainy School of Medicine
Cairo University

**For more details about imaging, ECG, Clinical pathology , see Paraclinical Made easy for the author.**

# CLINICAL DISCUSSION

❖ **What is the definition of liver cirrhosis & causes or types ?**

- **Definition :** diffuse chronic liver disease characterized by :
  - ○ Degeneration , fibrosis , regeneration nodules, irreversible loss of normal structure
- **Causes**

A. **A**lcoholic cirrhosis

B. **Bi**liary cirrhosis

C.

| | |
|---|---|
| ○ **C**ryptogenic (idiopathic) cirrhosis | ○ **C**ardiac cirrhosis |
| ○ **C**hronic hepatitis : post hepatitis cirrhosis<br>- Either post viral hepatitis (Virus B,C,D) or autoimmune (Lupoid hepatitis , primary sclerosing cholangitis ) | |

D. **D**rug induced : Alpha methyl dopa, Amidarone, INH & Methotrexate

E. **Miscellaneous :**

○ Metabolic causes

○ Non-alcoholic steatohepatitis

❖ **What is the definition of hypersplenism & the causes ?**

- **Definition :** exaggeration of normal splenic function (↑ phagocytic activity) leading to destruction of one or more of the blood cells :
  - ○ Monocytopenia, or bicytopenia or pancytopenia
- **Causes :**
  - ○ Secondary : splenomegaly
  - ○ Idiopathic : rare

❖ **What are the causes of ascites & treatment ?**

❖ **Causes :**

I. **Transudative ascites :**

A. **Organ failure :** liver cell failure & right side hear failure

B. **Portal hypertension:** causes of portal hypertension :

- **Supra-hepatic causes :** right ventricular failure, pericardial effusion, high IVC obstruction , Budd Chiari syndrome
- **Intra-hepatic causes :** liver cirrhosis , Veno-occlusive Disease, Bhilharzial periportal fibrosis
- **Infra-hepatic causes :** portal vein obstruction e.g. thrombosis or malignancy

C. **Hypoalbuminemia** e.g. nephrotic & nephritic syndrome & severe malnutrition

D. **Miscellaneous** e.g. myxedema , Meig's syndrome

II. **Exudative ascites :**

○ **Peritoneal disease** e.g. Tb peritonitis & spontaneous bacterial peritonitis

○ **Pancreatic ascites** due to pancreatitis

II. **Chylous ascites :** due to obstruction or rupture of thoracic duct e.g. Tumor or trauma

V. **Hemorrhagic ascites** due to hemorrhagic blood disease

❖ **Treatment :**

| | | |
|---|---|---|
| ○ Bed rest to unload liver | ○ Diet : increase protein and decrease salt | ○ Salt free albumin & diuretics |
| ○ Lee veen shunt: peritoneo-venous shunt (between peritoneum & SVC) | | ○ Tapping |

❖ **What are signs of ascites ?**

1) **Inspection :**

- Generalized abdominal distention with fullness in flanks, umbilicus is shifted downwards & umbilicus is bulging

2) **Palpation :** transmitted thrill

3) **Percussion :** knee elbow & shifting dullness

4) **Auscultation :** Puddle sign

5) **Ultrasonography :** if clinically is not evident

6) ± fullness in Douglas pouch by **P.V.** examination

❖ **What are the precipitating factors for hepatic encephalopathy ?**

| | | |
|---|---|---|
| High protein diet | GIT bleeding | Constipation |
| Hypokalemia | Rapid tapping of ascites | Infection |

❖ **What is the most important treatment of hepatic encephalopathy ?**

| | | |
|---|---|---|
| Enema | Lactulose & neomycin | Protein restriction |

## FREQUENTLY ASKED QUESTIONS FOR MID & END ROUND EXAM

**Test yourself!**

| | |
|---|---|
| 1) Surface anatomy of the liver? | 2) What are the causes of generalized abdominal swelling? |
| 3) What are signs of ascites? | 4) How to differentiate intra-abdominal from extra-abdominal swelling |
| 5) How to differentiate between lipoma, hernia & varicose vein on abdomen? | 6) What are causes of wide subcostal angle? |
| 7) What are the causes of divarcated recti? | 8) What are causes of downward displacement of umbilicus? |
| 9) What are causes of bulging of umbilicus? | 10) What is caput medusa? |
| 11) What makes an adult male has a feminine hair distribution (straight instead of triangular)? | 12) What are the complications of scar? |
| 13) What are causes of stria alba? | 14) What are the causes of stria rubra? |
| 15) What are the medical causes of pruritis? | 16) What is the causes of visible veins on abdomen? |
| 17) If there is a dilated vein below umbilicus, how to differentiate it's causes? | 18) What are types of hernia ? |
| 19) What are the causes of visible peristalsis ? | 20) What is the importance of examination of male genitalia in abdominal case? |
| 21) What are the aims of superficial palpation? | 22) What is the difference between guarding & rigidity ? |
| 23) What are normally palpable structures in the abdomen? | 24) What are different methods of palpation of liver and spleen? |
| 25) What are points to comment on for palpable liver or spleen? | 26) What is the liver span? |
| 27) What are the causes of tender liver? | 28) What are the causes of multiple splenic notch? |
| 29) What are the causes of absent notch? | 30) Mofti's sign? |
| 31) Causes of pulsating liver? | 32) What is the method of renal palpation? |
| 33) What is meant by huge spleen ? what are its causes? | 34) How can you differentiate splenomegaly from renal mass? |
| 35) What are causes of ascites? | 36) What is the type of percussion of abdomen? |
| 37) What is the importance of detection of upper border of liver before palpating it's lower border? | 38) What are the methods to detect early splenomegaly? |
| 39) Why spleen enlarge towards right iliac fossa? | 40) What are causes of vertical enlargement of spleen? |
| 41) Why we flex patient's lower limb during deep palpation of abdomen? | 42) Auscultation of the abdomen? |
| 43) What are the manifestation of liver cell failure? | 44) Investigation of a liver case? |
| 45) Causes or types of liver cirrhosis? | 46) Definition of liver cirrhosis ? |
| 47) Causes of portal hypertension? | 48) Definition of hypersplenism? |
| 49) Treatment of ascites? | 50) Causes of splenomegaly? |
| 51) Causes of hepatomegaly? | 52) Causes of tender spleen? |
| 53) Causes of palpable liver without hepatomegaly? | 54) What is the difference between ascites & ovarian cyst? |
| 55) What are the causes of gynecomastia ? | 56) How to diagnose gynecomastia? |
| 57) Causes of parotid enlargement ? | 58) Causes of pitting spleen? |
| 59) How to decrease portal hypertension in between attacks? | 60) Prophylaxis against portal hypertension ? |
| 61) All questions answered in the clinical discussion are very important. | |

## O.S.C.E QUESTIONS

| | |
|---|---|
| • Examine spleen | • Palpate for spleen |
| • Examine liver | • Palpate liver |
| • Examine for ascites & signs of LCF in LL | • Search for ascites & signs of DM in leg |
| • Palpate the abdomen | • Palpate the abdomen for organomegaly |
| • Signs of LCF on face | • Signs of chronic liver disease |
| • Signs of LCF in hand | • Examine ascites. |

# Bilharziasis “pure ß fibrosis “

- **Personal history: ……** & There is history of contact to water canals with no history of traveling abroad .
- **Complaint:** Pain in left & right upper quadrants of the abdomen one week duration.
- **HPI:**
  - The condition started 10 years ago by gradual onset and progressive course of dull aching localized **pain** in the left upper quadrant of abdomen, not related to position, respiration, exercise or meals. one year later, the patient develope dull aching localized **pain** in the right upper quadrant of abdomen, not related to position, respiration, exercise or meals. The patient saught medical advice, investigated by urine, stool analysis and abdominal ultrasonography and treated by silymarin and anti bilharzial treatment
  - The patient remained symptom free till one week ago when he re-experienced dull aching localized **pain** in the left right upper quadrants of abdomen, not related to position, respiration, exercise or meals.
  - No history of abdominal swellings, abdominal distension, upper or lower GIT symptoms, hepatobiliary or urogenital symptoms, no constitutional symptoms and no L.L oedema.
  - No symptoms of other system affection
- **Past history**
  - There is past history of **Bilharziasis** Since he was 9 years old, manifested by dysentery and terminal hematuria, investigated by urine and stool analysis, treated by distocid tablets.
  - No past history of blood transfusion, or past history suggesting previous attacks of acute hepatitis
  - No DM no HTN.
  - No past history of operations or drugs.
- **Family history**
  - No consanguinity, No common diseases, No similar condition.

## 1) General examination:

### A. Overview

- **Temperature** : 37
- **Blood pressure** 110/70
- **Pulse** : regular pulse, 75 /minute, average volume, no special characters, vessel wall is not felt, equal on both sides with intact peripheral pulsations, no radio-femoral delay.
- The patient is **fully conscious**, well oriented for time place and persons, average mood and memory, the patient is co-operative with average intelligence.
- the patient looks **well** average. **built**, No **jaundice, mild pallor ,no cyanosis**.

### B. H&N

- No parotid enlargement, no fine silky hair, no fetor hepaticus, no wasting of muscles, the skin shows no spider naevi or paper money appearance.
- Neck veins are pulsating not congested.

### C. Extremities

- No oedema L.L.
- No clubbing, no leuchonychia, no capillary pulsations and no flappy tremors.
- The skin shows no spider naevi, no palmer erythema, no paper money appearance, no S.C haemorrhage. no wasting of muscles .

## 2) Local examination:

### a) Inspection

- The abdomen moves freely with respiration, normal abdominal contour, there is localized oval shaped swelling in the lef hypochondrium and left lumber regions which decreased in size on doing rising up test, no dilated veins, regarding the skin: there is no scars, no stria no scratch marks, no sc haemorrhage, no pigmentation, no oedema in anterior abdominal wall with normal skin elasticity, no abdominal or inguinal hernias and no gynecomastia. There is wide subcostal angle confirmed by thumb test, mild epigastric pulsation, no visible peristalsis. There is mild divarication of recti. Regarding t umbilicus, it is shifted downwards flat and transverse in shape no hernia no discharge. The skin shows no dilated veins r nodules no scars, pigmentation or ulcers, there is male distribution of suprapubic hair with normal genitalia, regarding th back no deformity, no swelling, no scars.

**b) Palpation:**

- ***By superficial palpation*:**
  - Apart from oval shaped swelling in the left hypochondrium and left lumber regions, no other swellings, no rigidity, no tenderness, no hyperesthesia.
- ***By deep palpation:***
  - The **liver** is firm in consistency ,sharp border ,the right lobe is felt 3 fingers below the right costal margin in the right midclavicular line while the left lobe is felt hand breadth below xiphisternum in the midline with smooth surface. It is neither tender nor pulsating (*to be differentiated from other masses in the right hypochondrium*)
  - The **spleen** is firm in consistency, rounded notched border, it is felt 7 fingers below the left costal margin (or it is huge in size) with smooth surface, it is not tender or pitted (*to be differentiated from other masses in the left hypochondrium and left lumber specially left kidney).*
  - Otherwise, there is **no other palpable abdominal organs.**

**c) Percussion:**

- Upper border of liver is in the 6th intercostals space in the right midclavicular line detected by heavy percussion with the hepatic san =16 cm.
- There is dullness below the right costal margin and xiphisternum detected by light percussion and continuous with the hepatic dullness.
- There is dullness at the level of the umbilicus detected by light percussion and continuous with traub's area dullness.
- No ascites detected by percussion .

**d) Auscultation**

- There is audible intestinal sound, no vascular sounds no hepatic or splenic rubs no sucussion splash, no ascites detected by puddle's sign. the liver is detected below the right costal margin by scratch test .

**? What is your diagnosis ?**

- **A case of hepatosplenomegaly for D.D most probably bilharzial, there is no signs of LCF and no previous attacks of bleeding with no complications *Or***
- **A case of hepatosplenomegaly for D.D most probably bilharzial, there is vascular decompensation but no cellular decompensation with no complications .**

**? Why .... ?**

- **Hepatosplenomegaly? from local exam and sonar.**
- **Bilharzial? from history, urine and stool analysis and serological tests for bilharzia (rectal snip is much better).**
- **No cellular decompensation? from absence of symptoms and signs of LCF and LFTs.**
- **Vascular decompensation? from signs of portal hypertension (splenomegaly,portal venography and manometr are much better).**
- **Not Complicated? as there is no evidence of spontaneous bacterial peritonitis, malignancy or hypersplensim *(see diagnosis of abdominal case to know how to detect each one).***

**? How would you proceed to manage this case?**

**A. Investigation**

- **Urine and stool analysis for viable bilharzial ova.**
- **Blood for CBC (anemia), LFT, serological tests of bilharziasis, hepatitis markers.**
- **ECG for bilharzial cor pulmonale.**
- **Barium studies for .......**
- **Ultrasonography for .........**
- **Endoscopies upper and lower for ............**

**B. Treatment**

- **Stop any hepatotoxic drugs**
- **Silymarin**
- **B-blockers (inderal) to decrease the portal pressure specially if there is varices deteced by endoscopy (silent varices as no bleeding in the pateint's story)**
- **Spleen can be excised if it is accused in blood cells destruction (hypersplenism)**

❖ **Does portal hypertension of Bilharziasis cause ascites ?**

- Portal hypertension alone rarely causes ascites; it only localizes the transudate to the peritoneal cavity, however: in hepatic schistosomiasis, ascites may develop late due to associated hypoalbuminemia.

❖ **What causes associated hypoalbuminemia in hepatic schistosomiasis?**

- **Decreased intake :** nutritional deficiency due to poverty
- **Decreased absorption :** malabsorption due to intestinal congestion
- **Decreased production :** due to associated cirrhosis in mixed pathology
- **Increased loss :**
  - Bleeding : bleeding esophageal varices
  - Protein losing enteropathy : colonic polyps & congestive enteropathy

❖ **Do you expect to find manifestations of liver cell failure in a Bilharzial liver?**

- No, because in Bilharziasis there is only fibrosis ( no degeneration, no regeneration, no loss of architecture ).
- Unless: there is associated viral hepatitis, especially HCV.

❖ **What are the grades of hepatic schistosomiasis (bilharziasis)?**

- **Clinical stages of hepatic schistosomiasis:**

A. Stage I: Hepatomegaly
B. Stage II : Hepatosplenomegaly
C. Stage III :Shrunken liver & splenomegaly
D. Stage IV: Shrunken liver , splenomegaly & ascites

→ **N.B.: premature ascites means ascites occurs in stage I & II because of :**

a) Hepatitis with bilharziasis causing liver cell failure
b) Bilharzial cor pulmonale
c) Marked malnutrition and mal-absorption caused by bilharzial dysentery

❖ **Can bilharziasis and hepatitis affect each other ? how ?**

- **In bilharzial patient:**
- His main problem is vascular → bleeding → not dangerous as he has good clotting factors
- In case he got Hepatitis: Hepatitis cause LCF → destruction of clotting factor → hematemesis till
- **In hepatitis patient :**
- regeneration nodules depend on hepatic artery & portal vein for blood supply,
- In case he got bilharziasis, hematemesis → hypovolemia & hypotension occurs → damage of regeneration nodules → LCF

❖ **Which type of Schistosoma is blamed to cause corpulmonale ?**

- S. mansoni because they reach the lungs with difficulty only in the presence of portal hypertension & porto-systemic collaterals which allow the ova to bypass the liver to the lungs, however; they cause more destructive lesions than S. haematobium.

❖ **Why bilharzial patient more exposed to hepatitis ?**

a) Decreased cell mediated immunity
b) Blood transfusion
c) Injection treatment " Tartar emetic"
d) Virus incorporated into bilharziasis

❖ **What are the character of hepatitis in bilharzial patient with hepatitis?**

- Worse than normal course due to:
  - ↑ incidence of carrier state
  - ↑ incidence of development to cirrhosis
  - ↑ incidence of development to malignancy

❖ **What are the values of PR in bilharziasis :**

- Polyps, Piles, Prostate enlargement & Bladder malignancy

❖ **What is the main presentation of Intestinal Bilharziasis?**

- Bleeding per rectum ( Hematochezia ).

❖ **When bilharziasis can cause bleeding per crectum?**

- B polypi & Portal hypertension → secondary piles

# Mixed bilharzial & hepatitis cirrhosis

**(In this sheet, I will focus on differences between this case and the previous)**

- **Personal history ….**
- **Complaint:** Pain in left upper quadrant of abdomen of one week duration.
- **HPI:**

- The condition started 10 years ago by an attack of **hematemesis** ,preceeded by nausea and vomiting. The blood was dark red in colour, containing food particles, not associated with loss of consciousness, the patient was admitted to Zagazig university hospital where resuscitation was done by fluids and blood transfusion and endoscpoy was done to stop bleeding ,the attack was followed by melena for3 days.
- The patient was followed up by regular scleotherapy.
- The patient remained symptom free till 5 years ago when he experienced gradual onset, progressive course of **abdominal distension** associated with bilateral pitting painless **lower limb oedema** reaching the mid leg level for which the patient was admitted to hospital,investigated by LFTs and abdominal ultrasonography and treated by diuretics.
- The patient remained symptom free till one week ago when he experienced gradual onset, progressive course of **localized dull aching pain** at Lt upper quadrant of the abdomen not related to position, respiration, exercise or meal.
- No history of abdominal swellings, other upper or lower GIT symptoms, hepatobiliary or urogenital symptoms, no constitutional symptoms.
- No symptoms of other system affection

- **Past history ….**
- **Family history …**

## 1. General exam

### A. Overview:

- **Temperature** : 37
- **Blood pressure** 110/70
- **Pulse** : regular pulse, 75 /minute, average volume, no special characters, vessel wall is not felt, equal on both sides with intact peripheral pulsations ,no radiofemoral delay.
- The patient is **fully conscious**, well oriented for time place and persons, average mood and memory, the patient is co-operative with average intelligence, the patient looks well, average built, no jaundice, no pallor or cyanosis.

### B. H&N

- No wasting of muscles. No parotid enlargement, no fine silky hair, no fetor hepaticus, the skin shows no spider naevi or paper money appearance
- Neck veins are pulsating not congested .

### C. Extremities

- Mild bilateral pitting **L.L oedema** reaching mid leg level and not tender.
- No Wasting of muscles.
- No clubbing, no leuchonychia, no capillary pulsations and no flappy tremors.
- The skin shows no spider naevi, no palmer erythema, no paper money appearance, no S.C haemorrhage .

## 2. Local exam :

### A. Inspection

- The abdomen moves freely with respiration, generalized abdominal distension, there is no localized bulge, no dilated veins, regarding the skin: there is no scars, no stria no scratch marks, no sc haemorrhage, no pigmentation, no oedema in anterior abdominal wall with normal skin elasticity, there is no inguinal, femoral or umbilical hernias and no gynecomastia. There is wide subcostal angle confirmed by thumb test, no epigastric pulsation, no visible peristalsis. There is divarication of recti. Regarding the umbilicus, it is shifted downwards but inverted and transverse in shape no hernia no discharge. The skin shows no dilated veins no nodules no scars, pigmentation or ulcers, there is male distribution of suprapubic hair with normal genitalia, regarding the back no deformity, no swelling, no scars.

### B. Palpation

- ❖ ***By superficial palpation:***
- No swellings, no rigidity, no tenderness, no hyperesthesia .
- ❖ ***By deep palpation:***
  - The liver is firm in consistency, sharp border, Rt. lobe is felt 4 finger under Rt. costal margin in the right MCL, lt. lobe felt 4 fingers below xiphistemum in midline, with smooth surface no tenderness, no pulsation.
  - The **spleen** is firm in consistency ,rounded notched border, it is felt 3 fingers below the left costal margin (or it is huge in size) with smooth surface, it is not tender or pitted (*to be differentiated from other masses in the left hypochondrium and left lumber specially left kidney).*
  - Otherwise, there is **no other palpable abdominal organs**.

### C. Percussion

- Upper border of liver is in the 5th intercostals space in the right midclavicular line detected by heavy percussion
- There is dullness 4 fingers below Rt. costal margin and 4 fingers below xiphisternum continuous with hepatic dullness detected by light percussion
- There is dullness detected 3 fingers below the left costal margin detected by light percussion and continuous with traub's area dullness.
- There is no ascites detected by shifting dullness ***(search for mild ascites by percussion in knee elbow position)*** .

### D. Auscultation

- There is audible intestinal sound, no vascular sounds no hepatic or splenic rubs no sucussion splash, no puddle's sign. The liver is detected below the right costal margin by scratch test.

### ? What is your diagnosis ?

- ❖ **Diagnosis :**
- **A case of hepato-splenomegaly for D.D most probably mixed bilharzial cirrhosis, there is some signs of LCF and previous attacks of bleeding with no complications.** ***Or***
- **A case of hepato-splenomegaly for D.D most probably mixed bilharzial cirrhosis, there is vascular and cellular decompensation with no complications**

### ? Why ... ?

- **Splenomegaly? from local exam and sonar**
- **Mixed bilharzial cirrhosis? from history, urine and stool analysis,hepatitis markers and serological tests for bilharzia (rectal snip is much better)**
- **Cellular decompensation? from of symptoms and signs of LCF and LFTs**
- **Vascular decompensation? from signs of portal hypertension (splenomegaly, portal venography and manometry are much better) and bleding.**
- **Not Complicated? as there is no evidence of spontaneous bacterial peritonitis, malignancy or hypersplensim** ***(see diagnosis of abdominal case to know how to detect each one).***

### ? How would you proceed to manage this case?

- ❖ **Investigation**
- **Urine and stool analysis for viable bilharzial ova**
- **Blood for CBC(anemia),LFT, serological tests of bilharziasis, hepatitis markers**
- **Ascetic fluid analysis for ...........**
- **ECG for bilharzial corpulmonale**
- **Barium studies for .......**
- **Ultrasonography for .........**
- **Endoscopies upper and lower for ............**

- ❖ **Treatment**
- **Stop any hepatotoxic drugs**
- **Treatment of hemtemesis in between attacks (band ligation better than sclerotherapy, TIPS can be tried)**
- **Treatment of ascites if present ......**

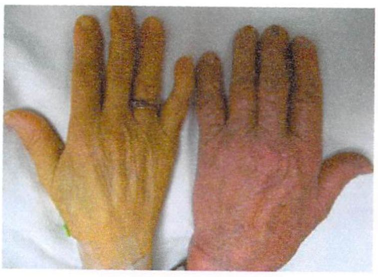
# HEMOLYTIC ANEMIA

A. BETA Thalassemia "Thalassemia major, Mediterranean anemia"
B. Sickle cell anemia

## History

A. Abdominal sheet but focus on (pain, swelling, jaundice)
B. Cardiological sheet (↓COP, systemic congestion, pulmonary congestion)

1) **Personal history: …**
2) **Common Complaint :** abdominal distention, pallor, yellowish discoloration of the eye, pain
3) **History of present illness :**

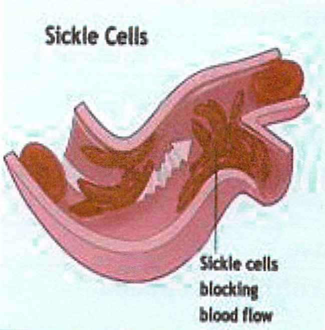


- Frequency of blood transfusion
- Anemia : symptoms & complications
  - Pallor, Palpitation
  - Dyspnea
  - Easy fatigue, lassitude
  - Headache , blurring of vision
  - Failure to thrive; stunted growth
- Complications of repeated blood transfusion

❖ **Specific for Thalassemia major:**

- Onset (after 6 months)
- Positive family history
- Residence (Mediterranean)
- Complications of hemosiderosis: cardiomyopathy, HF, DM, cirrhosis (LCF) ,… etc
- Operation for Splenectomy or cholecystectomy
- Complications of hypersplenism : bleeding tendency & increase the rate of blood transfusion
- Hemolytic crisis : fever, rigors ,bone pains, abdominal pain ,Lion pain, dark urine + anuria & shock

❖ **Specific for Sickle cell anemia**



- History of infection
- Autosplenectomy
- Abdominal pain
- Pain in hands & abdomen " hand & foot syndrome"

4) **Past history :** drugs causing hemolytic anemia
5) **Family history** of similar condition or consanguinity

## Examination

❖ General + local (abdominal examination) :

**I. General Features of Hemolytic Anemia**

1. **Signs of anemia :**

A. **Pallor :** best detected in mm of mouth, palmer creases & nail folds
B. **Hyperdynamic circulation:**

- **Pulse :** tachycardia , big pulse volume, water hammer pulse, exaggerated carotid pulsation.
- **Heart :** Accentuated heart sounds, S3, haemic murmur
  - ☞ Haemic murmur should be differentiated from AR:
  - ☞ Haemic murmur :
    - Heard all over the heart & best on the base of the heart (pulmonary area)
    - Low intensity , soft systolic with no thrill
- In severe cases **high COP HF**

**C. Oedema of LL may occur due to :**
- Hypoxia which increases the capillary permeability
- Salt & water retention
- HF from chronic Anemic or cardiomyopathy

**2. Failure to thrive : stunted growth , short stature**

**3. Spooning of nail due to:**
  - ○ Iron deficiency anemia
  - ○ Liver disease (hemochromatosis)

**4. Hemolytic jaundice :**

**A. Skin pigmentation :** greenish brown (Pallor + Jaundice + hemosidrosis)

**B. Eye :** mild jaundice : lemon yellow Jaundice

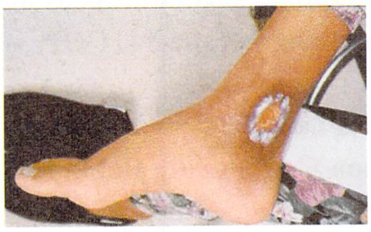
**C. Stool :** dark (excess stercobilinogen)

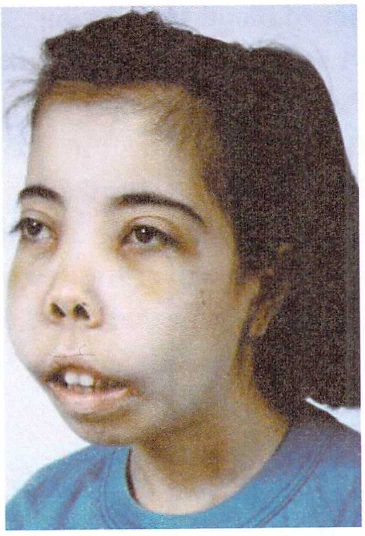
**D. Urine is normal , but darkens if:**
- Left to stand
- Hemolytic crisis
- Pigment stones

**E. Gall bladder :** pigment stones (Scar for cholecystectomy)

**F. Chronic leg ulcers surrounded with pigmentation, oedema , ischemia**

**G. Hepatomegaly**





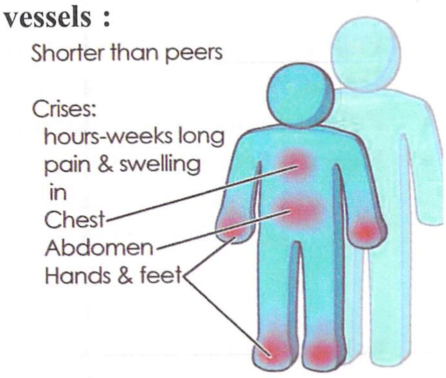
### II. Specific Features in thalassemia major:

- **Splenomegaly**
- **Scar** for splenectomy
- **Hemosiderosis :** cardiomyopathy, HF, DM, cirrhosis,… etc
- Expansion of BM : **Mongoloid face's :**
  - ○ Expansion of forehead "protrusion of frontal & parietal bone"
  - ○ Depressed nasal bridges
  - ○ Prominent maxilla
  - ○ Protruding upper central incisors
- **Crisis :** 3 main types in thalassemia major :

| | A. Hemolytic crisis | B. Aplastic crisis | C. Megaloblastic crisis |
|---|---|---|---|
| • Cause | ○ Sudden hemolysis with excess Hb | ○ Sudden depression of BM (viral infection) | ○ Folic acid deficiency (gradual) |
| ❖ Clinical picture | | | |
| • Anemia | ○ Become worse | ○ Become worse | ○ Mild change |
| • Jaundice | ○ Become worse | ○ Constant | ○ Mild change |
| • Others | ○ Fever, rigors ,bone pains, abdominal pain ,Lion pain, dark urine + anuria & shock | ○ Symptoms of infection (pancytopenia) | ○ Symptoms of infection (pancytopenia) |
| ❖ Investigations | | | |
| • Reticulocytes | ○ Increase | ○ Absent | ○ Absent |
| • BM | ○ Erythroid hyperplasia | ○ Absent erythroid series | ○ Megaloblastic changes |

### III. Specific Feature in sickle cell anemia:

- **Autosplenectomy:** from multiple splenic infarction
  - Palpation of spleen in adults with hemolytic anemia : never sickle cell anemia
- **Vaso-occlusive crisis** in sickle cell anemia only : painful occlusion of the blood vessels :
  - **A. Infections :** Chest, Bone (osteomyelitis)
  - **B. Cardiac :** MI
  - **C. Chest :** cor-pulmonale
  - **D. Abdomen :** Mesenteric occlusion; acute abdomen, Priapism
  - **E. Neurology:** Stroke: hemiplegia, Retinal detachment & blindness
  - **F. Limbs :** Leg ulcers, Avascular necrosis of femur,
    Hand & foot syndrome (dactylitis ممكن تلاقي الصوابع مش طول بعض )



❖ **Discussion :**

| ❖ What are the causes of severe pallor in this case?<br>❖ When is anemia marked in hemolytic anemia? | ❖ What are the causes of deepening of jaundice in this case?<br>❖ When is jaundice marked in hemolytic anemia? |
|---|---|
| • Hemolytic crisis | • Hemolytic crisis |
| • Aplastic anemia | • Obstructive jaundice |
| • Megaloblastic anemia | • LCF |
| • Hypersplenism | • Hepatitis |
|  | • Incompatible blood transfusion |

❖ **Diagnosis :**

- A case of jaundice for DD most probably hemolytic anemia most probably thalassemia major or sickle cell anemia complicated by hemosidrosis , liver cirrhosis & hypersplenism

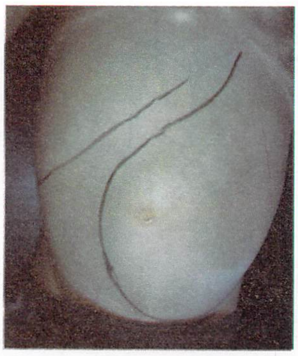
❖ **Why hemolytic anemia :**

- History : repeated blood transfusion
- Examination : pallor , jaundice, hepatosplenomegaly
- Investigation : ↑ reticulocytic count

❖ **Why :**

|  | A. Thalassemia major | B. Sickle cell anemia |
|---|---|---|
| • Common in | ○ Mediterranean countries | ○ Negros |
| • By history | ○ Residence<br>○ Positive family history | ○ History of vasoocclusive syndrome<br>○ History of infection |
| • By examination | ○ Face " thalassemic facies"<br>○ Huge spleen | ○ Evidence of vasoocclusive e.g. stroke<br>○ Impalpable spleen |
| • By investigation | ○ Type of anemia : hypochromic microcytic<br>○ Hb electrophoresis (HbF) | ○ Sickle cell<br>○ Hb electrophoresis (HbS) |

## HUGE SPLENOMEGALY



❖ **Definition :** enlarged spleen that crosses the midline

❖ **Etiology :** see before in the abdomen

❖ **History & examination :**

- As abdomen but focus on the following to know the diagnosis of the case:

1. **Thalassemia major**: see before
   A. Age of onset : childhood
   B. Symptoms & signs of anemia symptoms & signs of hemolytic anemia
   C. Symptoms & signs specific to thalassemia major

2. **Chronic myeloid leukemia:**
   A. Symptoms & signs of anemia
   B. Prolonged fever & recurrent infection
   C. Bleeding tendency for gum, epistaxis ,skin for purpura ecchymotic patches
   D. Bony pain (arthralgia, arthritis) & sternal tenderness
   E. History of sternal puncture
   F. Other swellings in the body: Examination of all LN of the body
   G. Gum hypertrophy

3. **Portal hypertension**: 2ry to:
   A. Post hepatitis cirrhosis:
   - History of blood transfusion
   - Signs of LCF

   B. Bilharziasis:
   - History of B, contact with canal water

4. **Malaria & kala azar**
   - History of travelling to other countries
   - History of fever & rigors

5. **Amyloidosis**
   - History of other system affection e.g. renal or chest (SLS)

# BLEEDING TENDENCY

❖ **Complaint :**

- Reddish spots with or without mucous membrane bleeding
- Post – traumatic swelling

❖ **History & examination** : as abdomen but focus in the following to know the diagnosis of the case :

| ❖ Types | A. Purpura ( In vascular / platelet defect) | B. In coagulopathy e.g. Hemophilia |
|---|---|---|
| ❖ Age | ○ Any age | ○ Since birth e.g. Circumcision<br>○ After operations : Tooth extraction , tonsillectomy |
| ❖ Sex | ○ Females | ○ Males |
| ❖ Family history | ○ Negative | ○ Positive |
| ❖ Hess test (capillary fragility test) | ○ Positive | ○ Negative |

- Hess test : Method :
  - ○ A circle 5 cm in diameter is marked on the antecubital fossa.
  - ○ The sphygmomanometer is inflated to midway between SBP & DBP for 5 minutes.
  - ○ Count the number of petichae within the circle
- Result : positive test means the presence of more than 10 petichae
- Value : it is positive in all cases of purpura

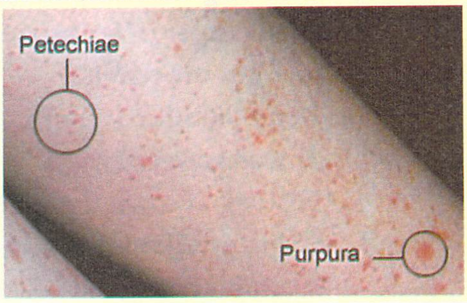
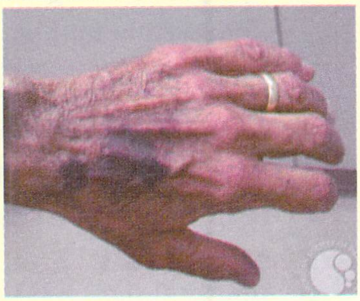
❖ Characters:

❖ Site of bleeding :

| | | |
|---|---|---|
| ▪ Cutaneous | ○ Petichae , purpura , ecchymosis | ○ Ecchymosis only |
| ▪ Orificial | ○ Epistaxis, hemoptysis, hematemesis , Bleeding per rectum & melena , hematuria. | |
| ▪ Mucous membrane | ○ Oral, gingival , conjunctival bleeding . | |
| ▪ Internal | ○ Intracranial hemorrhage (convulsion , ↑ ICT symptoms) , retinal hemorrhage, cavitary hemorrhage (serous membranes; pleura, pericardium, peritoneal hemorrhage ) | ○ Hemoarthrosis: spontanoues bleeding in joints (pain, swelling & movement limitation) → fibrosis & deformity<br>○ Muscle hematoma after IM injection, others like purpura |
| ❖ Mechanism of bleeding | ○ Spontaneously or post-traumatic | ○ Spontaneously or post-traumatic |
| ❖ Character of bleeding | ○ Immediate & of short duration < 1 day | ○ Delayed: days, weeks, months |
| ❖ Severity | ○ Mild bleeding (ooze) | ○ Severe = profuse |

**Remember :**

- **Reddish blue or purple discoloration of the skin that doesn't blanch on pressure :**

| ○ Petechiae : less than 2 mm | ○ Purpura: 2 mm to 1 cm | ○ Ecchymosis : more than 1 cm |
|---|---|---|
|  | |  |

| Petechiae | Ecchymosis |
|---|---|
| ○ Intradermal hemorrhage | ○ Subcutaneous hemorrhage |
| ○ mm | ○ cm |
| ○ Not raised | ○ Raised |
| ○ Disappears without color changes | ○ Color changes |
| ○ Not related to the site of trauma | ○ Usually related to the site of trauma |

### ❖ Specific characters of the cause:

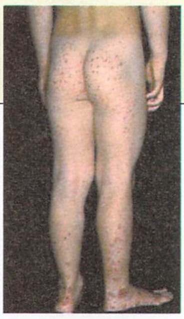
I. **Liver failure:** LCF symptoms & sign

II. **Aplastic anemia:**

- History of : Repeated blood transfusion, Cytotoxic drug intake , Prolonged course
- Similar condition in the family : Fanconi syndrome
- Skin examination: Purpuric eruption Generalized , variable size, not raised above the surface of the skin & doesn't blanch on the pressure

III. **Immune Thrombocytopenic Purpura (ITP):**

| A. ITP in child | B. ITP in adults |
|---|---|
| ○ Sudden acute onset with regressive course & short duration | ○ Chronic gradual onset with remission & relapses course |
| ○ Equal sex | ○ Female more than males |
| ○ History of preceding fever (viral infection) | ○ Associated with other autoimmune disorders e.g. SLE |
| ○ General features of purpura : see before | |
| ○ Skin examination: Purpuric eruption: Generalized , variable size, not raised above the surface of the skin & doesn't blanch on the pressure | |
| ○ Spleen is not palpable , if palpable never hugely enlarged | |
| ○ No blood transfusion , if there is blood transfusion , it's usually once | |



IV. **Henoch – Schonlein purpura:**

- History of : Arthrtitis , Abdominal pain, GIT bleeding , Hematuria
- Skin examination: raised palpable purpuric eruption (rash) with itching (vasculitis) especially over the buttocks & extensors surface of legs

V. **Malignancy** e.g. Leukemia:

- History of progressive course of Prolonged continuous fever, Bony pain & Recent marked weight loss
- Examination: Abdominal distension (HSM) & Any other swellings (LNs), bony pain

VI. **Hemophilia:**

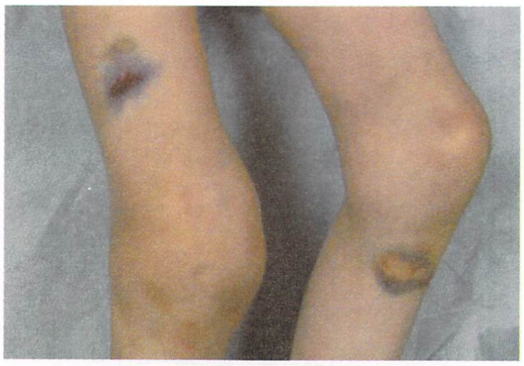
- History of bleeding Since birth e.g. Circumcision & After operations : Tooth extraction , tonsillectomy
- Muscle hematoma after IM injection
- Hemoarthrosis: joint pain, swelling (knee effusion), movement limitation → fibrosis & deformity

### ❖ Examination :

❖ فحص كامل لأن السبب ممكن يكون systemic مع التركيز على :

I. **General examination:**

- Skin for purpuric eruption & it's character
- Eye for conjunctival hemorrhage
- Mouth : gum bleeding
- Pallor in aplastic anemia (usually no pallor with ITP)
- Upper limb : Hess test
- Lower limb : knee effusion (hemoarthrosis); if +ve → coagulopathy



II. **Systemic examination:**

- Cardiac : hemorrhagic pericardial effusion
- Chest : hemorrhagic pleural effusion
- Abdominal :
  - Manifestations of liver cell failure
  - LN examinations to exclude leukemia
  - Spleen : hypersplenism & leukemia
  - Hemorrhagic ascites
- CNS: to exclude hemorrhage "cerebral or subarachnoid " : focal deficit "
- Joint : hemoarthrosis & Bone tenderness with leukemia

### ❖ Diagnosis

- A case of generalized purpuric eruption without pallor without organomegaly without lymphadenopathy most probably ITP post viral infection.
- A case of inherited coagulation defect most probably hemophilia

# GENERALIZED OEDEMA

| ❖ Causes | A. Right side heart failure (all causes) | B. Liver cell failure | C. Nutritional deficiency | D. Angioneurotic | E. Renal causes |
|---|---|---|---|---|---|
| ❖ History as abdomen: | ○ Cardiac history especially right side manifestation | ○ LCF Symptoms | ○ Nutritional habits | ○ History of drug intake (allergy) | ○ Renal symptoms |
| ❖ Examination:<br>❖ General & Local (abdominal) | ○ Character of cardiac oedema : see cardiology.<br>○ Oedema of LL always precedes appearance of ascites except in 2 conditions :<br>A. Pericardial effusion & constrictive pericarditis<br>B. TR<br>○ Hypotension in HF<br>○ Congested Pulsating neck veins .<br>○ Chest : infection, effusion : very important (pneumonia) | ○ Ascites occurs first then LL oedema<br>○ It's associated with features of liver disease<br>○ Examine :Abdomen : liver, jaundice, spleen ascites | ○ It occurs in severe Nutritional deficiency<br>○ Associated with other features of nutritional deficiencies | ○ This allergic oedema occurs with constant relation to certain factors e.g. eating certain food or inhaling certain substances<br>○ Acute onset especially lids, lips, larynx, but may be generalized<br>○ There is usually +ve family history of oedema or other forms of allergy<br>○ The patient himself may have other forms of allergy<br>○ There is characteristic rapid response to anti-allergic measures | ○ Oedema occurs first in eye lids & is associated with features of renal disease<br>A. **Nephritic :** acute onset of oliguria , mild hematuria, (smoky urine), minimal edema, hypertension<br>B. **Nephrotic :** edema , hyperlipidemia |

# RENAL OEDEMA

❖ **History** :as abdominal sheet but focus on the following points :

- Personal history : …
- Complaint : puffiness of eyelids
- Present history :

I. **Analysis of the complaint;** OCD, ↑↓, associated symptoms

II. **Symptoms of the same system :**

1. **Urinary symptoms :** change in the amount or in colour
    - Oliguria & hematuria in nephritic syndrome
2. **Headache (hypertension) :** in nephritic syndrome
3. **Symptoms of complications :**
    - Chest infection : fever, dyspnea
    - Skin infection
    - Urinary tract infections: dysuria, … etc.
    - Abdominal : pain ,vomiting (peritonitis or GIT congestion) & diarrhea
    - Rash , arthritis (with lupus nephritis – Henoch Schonlein purpura )
4. **Investigations & treatment :**

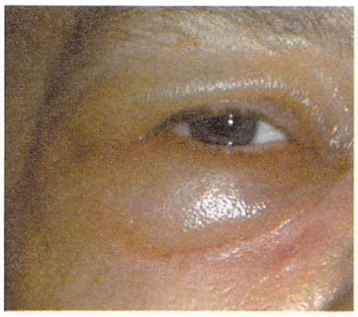
- Steroids or immunosuppressive & hospitalization

III. **Symptoms of other systems :**

- Hepatic & cardiac to exclude other causes of edema

❖ **Examination:** as general & local abdomen but focus on :

### I. General examination:



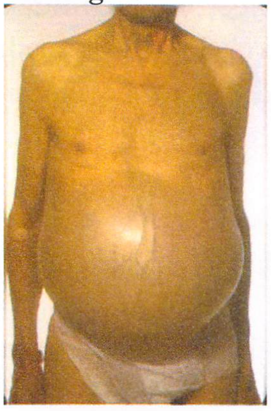
- BP: normal in nephrotic & high in nephritic ,

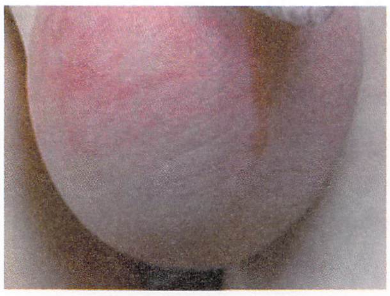
☠ *N.B.: causes of hypertension in Nephrotic syndrome :*

- *Nephritic nephrotic*
- *Collagen diseases e.g. SLE*
- *Complication of atherosclerosis or renal failure*
- *Steroids*

- Puffy eyelids
- Oedema start periorbital then face then sacrum then genitalia then general
- Pallor
- Xanthomata (hyperlipidemia)
- Cushinoid features in long standing treatment with steroids
- Lower limb edema : bilateral pitting not tender reaching …

### II. Abdominal examination:





- Generalized distention of the abdomen
- Stretched skin, Visible veins
- Divarication of recti
- Wide subcostal angle
- Tender & rigid abdomen suspect in peritonitis
- Ascites examination ….
- Scrotal edema

❖ **Diagnosis :**

- A case of generalized pitting oedema (associated with moderate or tense ascites for investigation) most probably nephrotic syndrome in (first attack or in relapse ) complicated by acute bronchitis

❖ **Why nephrotic ?**

- Character & distribution of edema
- Edema started over eye "periorbital"
- Gradual onset
- Absent hematuria ± normal blood pressure.

# Chronic Hemolytic Anemia

- **Personal history : …**
- **Complaint :** Pain in Lt. upper quadrant of abdomen of 2 weeks duration.
- **HPI:**

- The condition started since he was 12 years old by gradual onset, progressive course of **localized dull aching pain** at Lt upper quadrant of the abdomen not related to position, respiration, exercise or meal. The condition was associated with **fever**, **chills**, **bony pain**, **headache**, with **jaundice** of acute onset, progressive course with **dark urine** with no anorexia, nausea, vomiting, itching, cachexia, or fatty dyspepsia. Then the patient was admitted to hospital and investigated by liver function test which was normal and CBC which revealed severe anemia and the patient was advised to take regular Bl. Transfusion every 3 months.
- At age of 25 y the patient re-experienced the same attack of **fever**, **chills**, **headache**, **bone pain**, **jaundice** of acute onset, progressive course, **dark urine**, no anorexia, nausea, vomiting, cachexia or fatty dyspepsia. he was admitted to hospital and advised to take blood transfusion every month with some medication as folate, desferal.
- The patient remained quiet well until 2 weeks ago when he re-suffered from dull aching **pain** at lt. upper quadrant of abdomen of gradual onset, progressive course, not related to position, exercise, meal, respiration
- Apart from regular exertional **palpitation** ,there is no symptoms suggesting cardiovascular system affection.
- No history of other system affection

- **Past history:**
  - No history of operations, drug known to cause haemolysis, common diseases (DM, HPN).
- **Family history :** +Ve consanguinity, No Similar condition in family, No common diseases in family.
- **General examination :**
  - **Temperature:** 37° c., **Bl. Pressure:** 140/60.
  - **Pulse:** 70 beat/minute, big pulse volume, equal in both side, with water hammer pulse, blood vessels not felt, intact peripheral pulsation with no radio-femoral delay.
  - **Mentality:** The patient is fully conscious, well oriented for time, place and person. Average mood and memory. The patient is co-operative with average intelligence.
  - **Built:** Average Built, **Head & Neck**: pallor, jaundice, mongoloid features.
  - **UL:** there is pallor in palmar creases. (now improved)
  - **LL:** there is pigmentation (may be ulcers specially in sickle cell anemia ).
- **Local examination :**

- **By Inspection**: There is local swelling in Lt. upper quadrant of abdomen decreased by rising up test.
- **Palpation:**

- *By superficial palpation:* There is swelling in lt hypochondrium. No other swellings , rigidity or tenderness.
- *By deep palpation:*
  - The liver is firm in consistency, sharp border, Rt. lobe is felt 2 finger under Rt. costal margin in the right MCL, lt. lobe felt 3 fingers below xiphisternum in midline, with smooth surface no tenderness, no pulsation.
  - The spleen is firm in consistency, rounded border, huge in size, smooth surface, not tender, not pitted no other palpable abd. Organs.

- **Percussion:**

- Upper border of liver is in Rt. 6th intercostal space by heavy percussion with hepatic span is 16 cm at right MCL.
- There is dullness below Rt. costal margin, xiphisternum continuous with hepatic dullness detected by light percussion.
- There is dullness exceeding umbilicus and continuous with traub's area dullness detected by light percussion.

- **By Auscultation of the heart:** There is accentuated 1st and 2nd heart sounds, soft systolic murmurs all over pericordium (hemic murmurs) .
- **Investigations :**

- HB electrophoresis: detect fetal Hb (HBF -->80-90%)
- CBC: hypochromic microcytic anemia, reticulocytosis.
- Target cell in blood film.

- **Treatment :** Avoid precipitating factor (if possible), Repeated Bl. Transfusion, Desferral, Folic acid.
- **Diagnosis :** A case of hepato-splenomegaly for D.D most probably Chronic Heamolytic aneamia most probably thalassemia major

# LYMPH NODES

## ❖ Head & neck:

### I. Circular group:

A. Inner ring : Walderyer's ring: two palatine tonsil, lingual tonsil & pharyngeal tonsil

B. Outer ring:

| 1. Submental L.N.s | 2. Submandibular L.N.s | 3. Facial L.N.s | 4. Parotid L.N.s | 5. Pre-auricular L.N.s | 6. Post-auricular L.N.s | 7. Occipital L.N.s |
|---|---|---|---|---|---|---|
| **❖ Site:** | | | | | | |
| ○ In submental Δ | ○ In sub-mandibular Δ | ○ On buccinator muscle | ○ In parotid substance | ○ In front of tragus | ○ On the mastoid process | ○ Between mastoid process & external occipital protuberance |
| **❖ Afferent (drains):** | | | | | | |
| ○ Central part of tongue<br>○ Floor of mouth.<br>○ Middle part of lower lip | ○ Inner angle of eye & side of nose.<br>○ Cheek, angle of mouth, upper lip, side of tongue & lower lip except middle part | ○ Part of cheek | ○ Front of scalp | ○ Side of scalp | ○ Temporal part of scalp | ○ Back of scalp |
| **❖ Efferent:** | | | | | | |
| ○ Submandibular L.Ns but few Lymphatics into jugulo-omohyoid L.Ns → Lower deep cervical L.Ns | ○ Jugulo-omohyoid group of L.Ns → Lower deep cervical L.Ns | ○ Upper deep cervical L.Ns. | ○ Upper deep cervical L.N | ○ Upper deep cervical L.Ns | ○ Upper deep cervical L.Ns | ○ Lower deep cervical L.Ns |

### II. Vertical group:

#### 1. Superficial group:

- Superficial lateral cervical lymph nodes along the external jugular vein
- Superficial anterior cervical lymph node along the anterior jugular vein

#### 2. Deep group:

**A. Middle line L.N.s (Median Group) :**

- ○ Pre-laryngeal L.Ns (Delphian LN) located anterior to the thyroid cartilage
- ○ Pre-tracheal L.Ns located anterior to the trachea
- ○ Supra-sternal L.Ns. on supra-sternal notch

**B. Lateral group: deep cervical L.N.s:**

- ○ Deep cervical L.N.s which lie deep to sternomastoid muscle
- ○ Divided into Upper deep cervical L.Ns & Lower deep cervical L.Ns by intermediate tendon of omohyoid muscle
- ○ Divided into anterior & posterior by internal jugular vein
- ○ N.B.: Jugulo-digastric L.N.: is the first L.N. in the deep cervical & is located at the angle of the mandible

## ❖ Breast & trunk:

- **Palpate axillary & supra-clavicular L.N.s:**

**A. Axillary L.N.s: They drain the upper limb down to umbilicus. They arranged in 5 groups:**

| 1. The (Anterior) Pectoral group | 2. The (posterior) Sub-scapular Group | 3. The (Lateral) Humeral Group | 4. The (medial) Central Group | 5. The Apical Group |
|---|---|---|---|---|
| ❖ Site | | | | |
| ○ Under cover the pectoralis major. | ○ Along posterior axillary fold | ○ Along upper part of humerus | ○ Central part of axilla | ○ External apex of axilla |
| ❖ Drains | | | | |
| ○ Chest wall.<br>○ Whole breast except tail.<br>○ Anterior abdominal wall above umbilicus | ○ Axillary tail<br>○ posterior abdominal wall above umbilicus | ○ All the upper limb. | ○ 1 + 2 + 3 | ○ 1 + 2 + 3 + 4 + infra-clavicular L.Ns. |

**B. Supra-clavicular L.N.s:**

- ○ Site : above clavicle.
- ○ Right Supra-clavicular L.N. is called Scalene L.N. while left Supra-clavicular L.N. is called Virchow L.N.
- ○ Drains : from internal mammary L.Ns

## ❖ Upper limb :

| A. Superficial group of L.Ns: | B. Deep group of L.Ns: |
|---|---|
| ○ Supra-trochlear (Epitrochlear) group of L.Ns | ○ Lateral (Humeral) group of L.Ns |
| ❖ Site | |
| ○ Above medial epicondyle of humerus | ○ At surgical neck of humerus |
| ❖ Afferent | |
| ○ Same as delto-pectoral group. | ○ Drains all upper limb (deeply). |
| ❖ Efferent | |
| ○ Deep group of L.Ns | ○ Apical group of axillary L.Ns. |

## ❖ Abdomen :

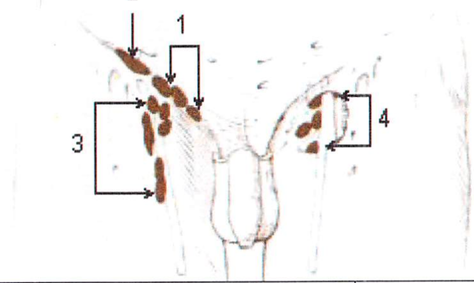
**A. External & Internal iliac L.Ns : along correspond arteries from umbilicus to mid-inguinal point**

**B. Common iliac L.Ns : along correspond arteries from umbilicus to mid-inguinal point**

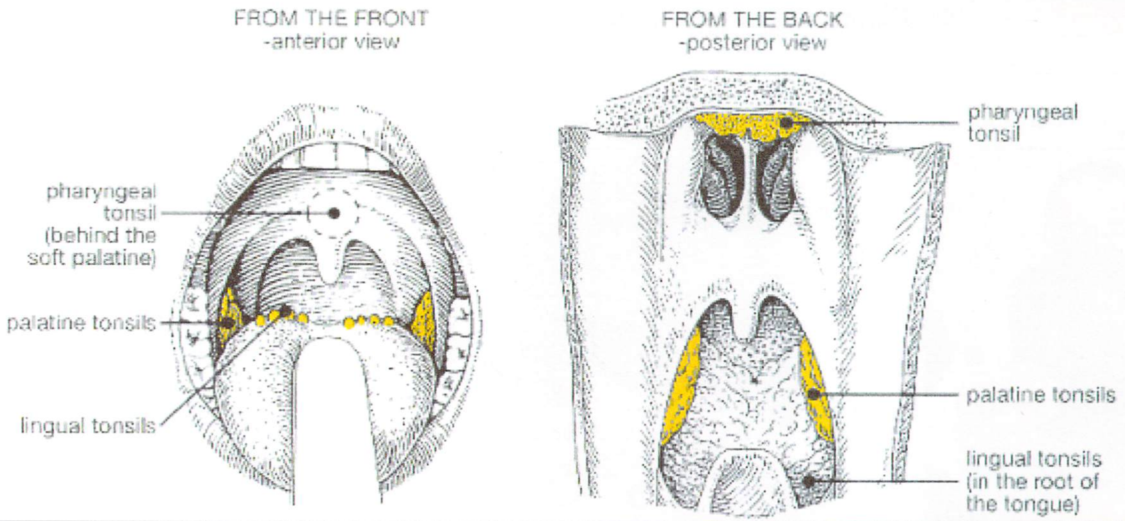
**C. Para-aortic group of L.Ns**

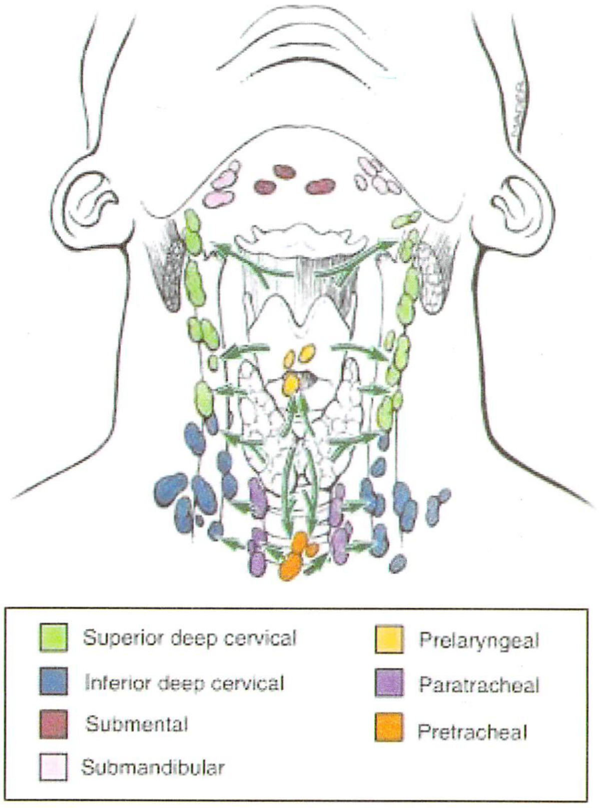
- ○ Site: One on each side of aorta from xiphisternum to umbilicus
- ○ Afferent : Drains internal Iliac L.Ns which drain pelvis and external iliac L.Ns which drain deep inguinal L.Ns
- ○ Efferent : Cysterna chyli

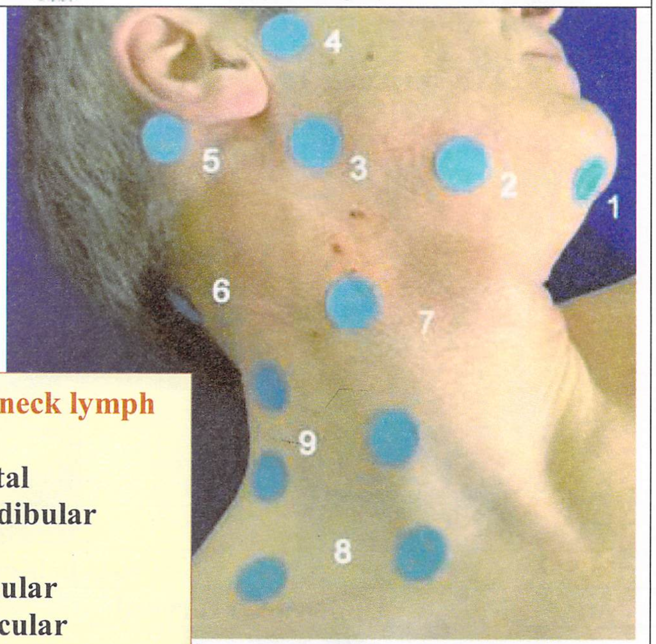
## ❖ Lower limb:



| I. Superficial groups of L.N.s | | II. Deep groups of L.N.s (4) |
|---|---|---|
| A. Vertical limb : lateral to long saphenous vein (3) | | ○ Along the femoral vein<br>○ The largest called Cloquet |
| B. Transverse limb : below & parallel to inguinal ligament: 2 parts | | |
| ✌ Medial part (1) | ✌ Lateral part (2) | |
| ❖ Drains: | | |
| ○ Anterior abdominal wall below level of umbilicus.<br>○ The perineum<br>○ The skin of external genetalia except glans penis. | ○ Post abdominal wall below level of umbilicus.<br>○ The gluteal region. | ○ Glans penis<br>○ All lower limb |

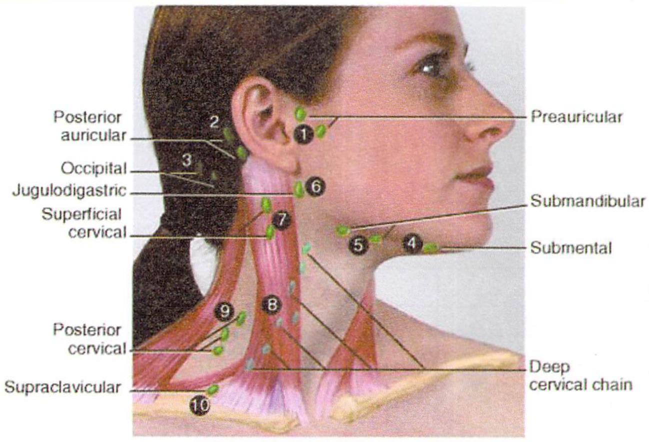

FROM THE FRONT
-anterior view
pharyngeal tonsil (behind the soft palatine)
palatine tonsils
lingual tonsils
FROM THE BACK
-posterior view
pharyngeal tonsil
palatine tonsils
lingual tonsils (in the root of the tongue)


🟩 Superior deep cervical
🟦 Inferior deep cervical
🟥 Submental
☐ Submandibular
🟨 Prelaryngeal
🟪 Paratracheal
🟧 Pretracheal



### ❖ Head & neck lymph nodes:

1. Submental
2. Submandibular
3. Parotid
4. Preauricular
5. Postauricular
6. Occipital
7. Anterior Cervical
8. Supraclavicular
9. Posterior Cervical


Posterior auricular
Occipital
Jugulodigastric
Superficial cervical
Posterior cervical
Supraclavicular
Preauricular
Submandibular
Submental
Deep cervical chain
1
2
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4
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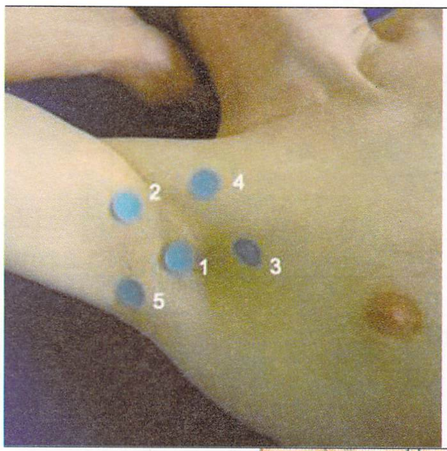
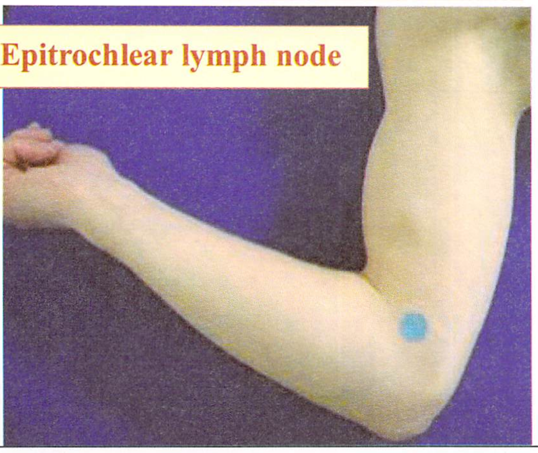
6
7
8
9
10

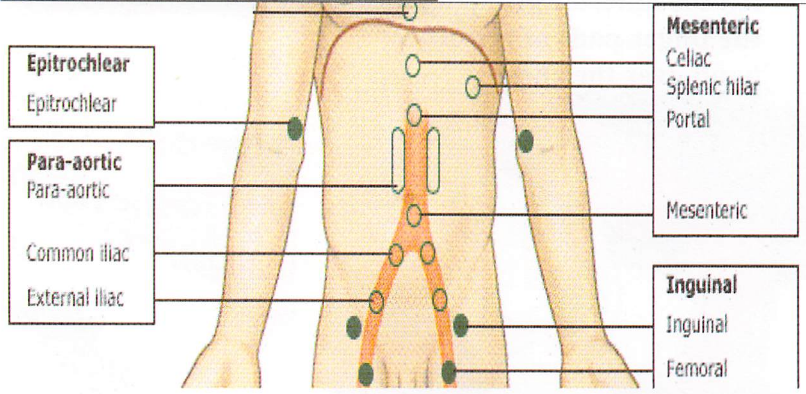


### ❖ Axillary lymph nodes

1. Central
2. Humeral
3. Pectoral
4. Apical
5. Subscapular

### ❖ Epitrochlear lymph node



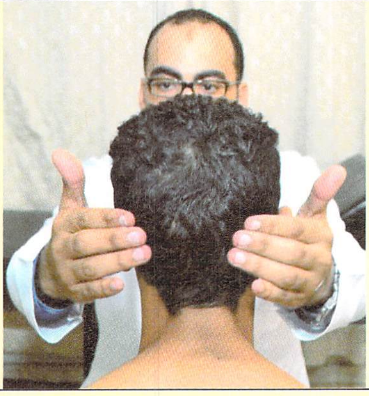

Epitrochlear
Epitrochlear
Para-aortic
Para-aortic
Common iliac
External iliac
Mesenteric
Celiac
Splenic hilar
Portal
Mesenteric
Inguinal
Inguinal
Femoral

## ❖ Examination of lymph node: Technique for palpation:

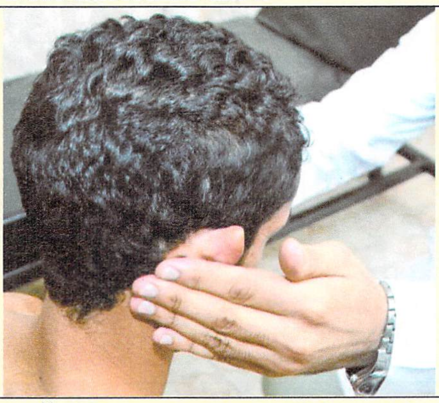
### ❖ Head & neck:

**From front : Facing the patient :**

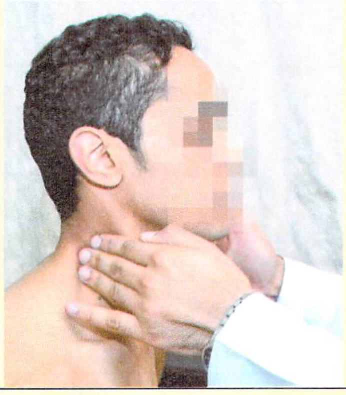
- **Occipital LN**



- **Post-auricular L.N.**

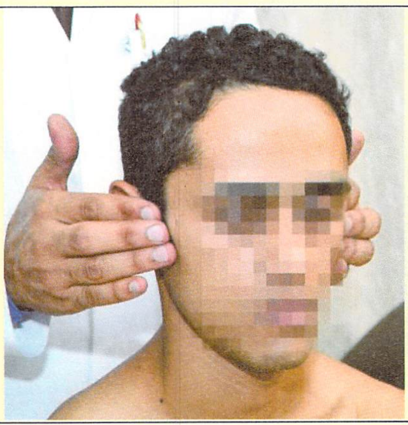


- **Posterior cervical**

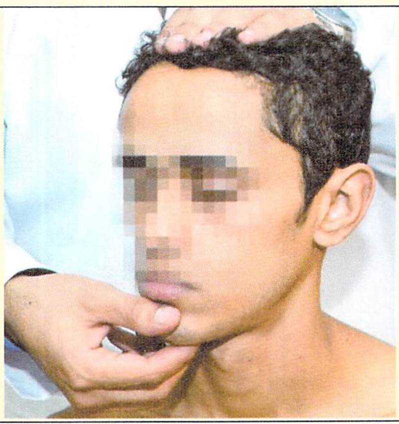


**From behind of the patient :**

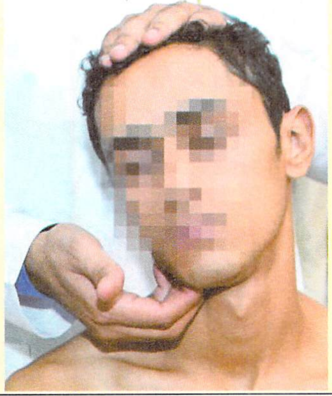
- **Pre-auricular LN**



- **Submental LN**

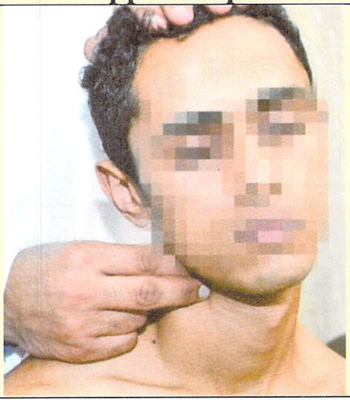


- **Submandibular: tilt the head to the side you examine**

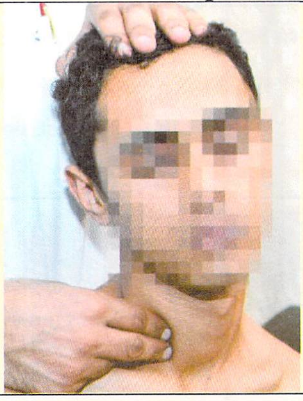


**From behind of the patient & head slightly flexed**

- **Upper deep cervical**



- **Lower deep cervical**

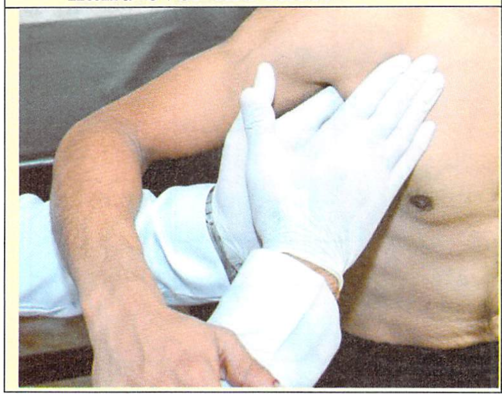


### ❖ Axillary LN:

**From front :**

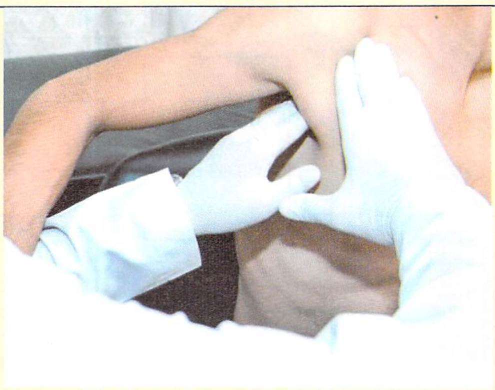
**A. Anterior (pectoral) group**

- Move your hand anteriorly behind the pectoralis major muscle down to axillary tail to fell the anterior group against the finger pads of the other hand over the chest



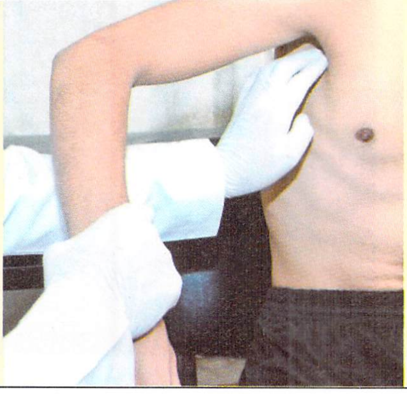
**B. Apical group**

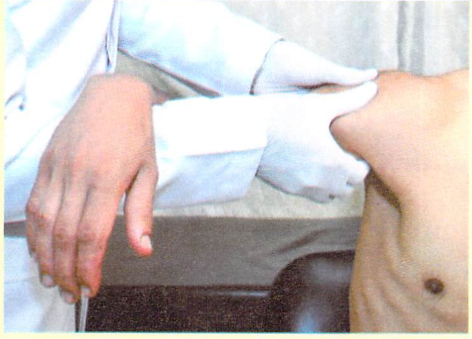
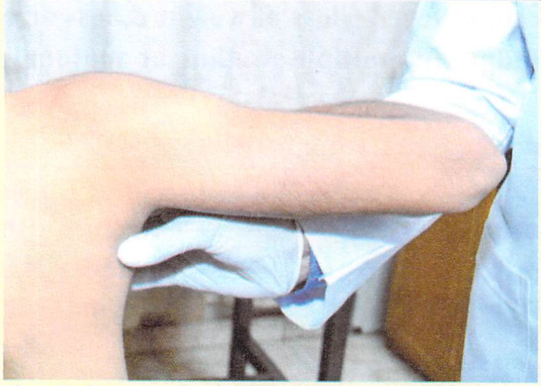
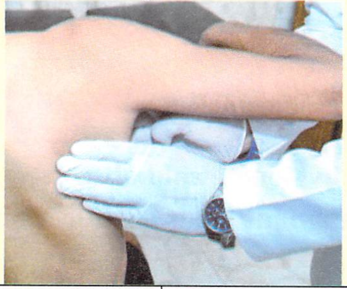
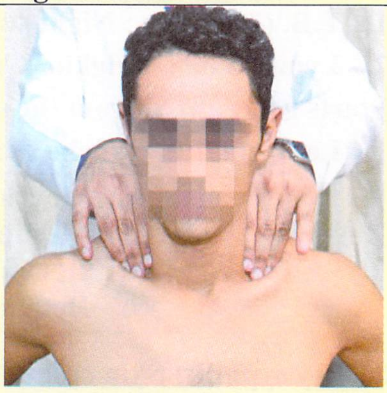
- Push the tips of fingers as high up into axilla as possible to feel the apical group

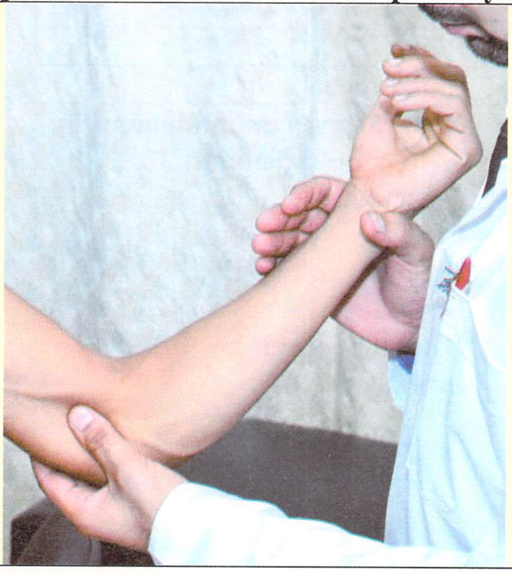
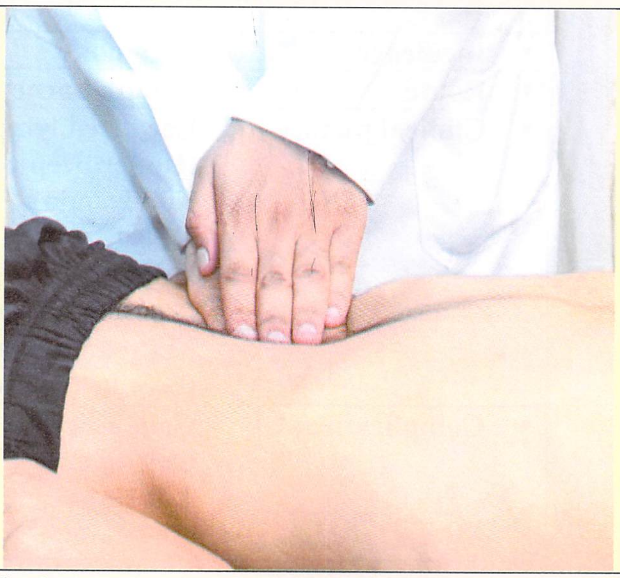


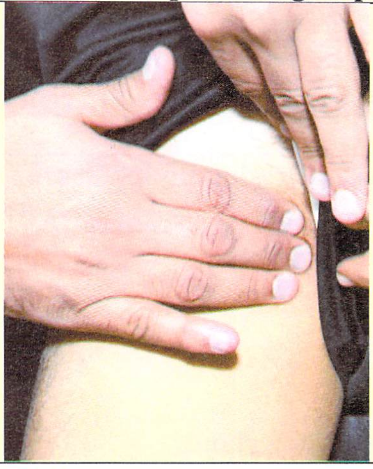
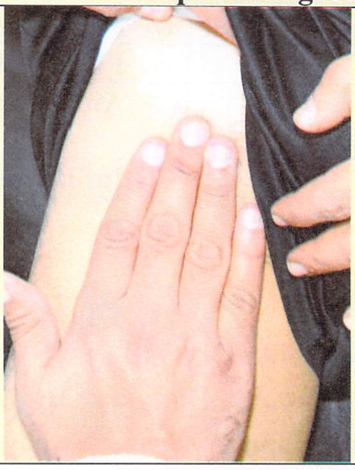
**C. Medial (central) group**

- By downward sliding movement



| ↳ From side : | ↳ From behind : | |
|---|---|---|
| **D. Lateral (humeral) group** | **E. Posterior (subscapular) group** | **F. Supra-clavicular L.N.s** |
| ○ Stand by the patient's side, put the fingers of both hands to deep aspect of upper end of the humerus to palpate the lateral axillary wall while thumbs rest on the deltoid region | ○ Stand behind the patient<br>○ Palpate the posterior fold of axilla with palm looking backwards, the posterior group is palpated against the thumb of the same hand | ○ Stand behind the patient and press 3 fingers of each hand into corresponding supraclavicular fossa then ask the patient to elevate the shoulder upwards and forwards then roll your fingers to fell the L.N. |
|  | <br>❖ Other technique :<br> |  |

| ❖ Upper limb : epitrochlear L.N.: with elbow flexed 30°, palpate in the groove between biceps & triceps about 3cm above medial epicondyle | ❖ Abdomen : para-aortic L.N. by Rolling technique |
|---|---|
|  |  |

| ❖ Lower limb | |
|---|---|
| ○ Vertical limb of superficial group | ○ Transverse limb of superficial group |
|  |  |

# LYMPHADENOPATHY

## Introduction:

## Generalized Lymphadenopathy:

❖ **Starts as one group then becomes generalized:**

1. T.B. (2ry) rare : Night sweat & night fever + loss of weight & loss of appetite
2. Lymphoma (Hodgkin & non Hodgkin): multiple swelling at anatomical site of L.Ns

❖ **Starts generalized from the start:**

1. Leukemia: Bone ache + bleeding tendency from orifices:

| | |
|---|---|
| • Mouth: | • Nose: Epistaxis |
| ○ Bleeding gums. | • Rectum :Bleeding |
| ○ Hemoptysis. | • Bladder Hematuria |
| ○ Hematemesis | • Vagina: Menorrhagia |

2. 2ry syphilis: Skin rashes + genital ulcer
3. Infectious mononucleosis (IMN): Skin rashes + glandular fever
4. AIDS

## Localized Lymphadenopathy:

1. T.B.(1ry) : No toxemia : Young + bad hygiene + cold abscess
2. Acute lymphadenitis :1ry septic or malignant focus e.g. ulcer or swelling or septic trauma at draining sites

## Remember

| | 1ry TB | 2ry TB |
|---|---|---|
| ▪ Incidence | ○ Common | ○ Rare |
| ▪ Route | ○ Lymph borne | ○ Blood borne |
| ▪ Clinical picture | ○ Localized lymphadenopathy (Upper deep cervical L.Ns)<br>○ No toxemia.<br>○ L.Ns :<br>– Painless, enlarged.<br>– (Firm, cystic, hard)<br>– Matted or rosary beads (Can be counted) | ○ Generalized lymphadenopathy (Lymphadenoid.)<br>○ Toxemia.<br>○ L.Ns :<br>– Painless, enlarged.<br>– Firm.<br>– Discrete & mobile (uniform size) |
| ▪ Complications | ○ Cold abscess<br>○ Calcification<br>○ T B sinus | ----- |

| Acute lymphadenitis | Non Hodgkin lymphoma | Hodgkin lymphoma (Lymphadenoma) |
|---|---|---|
| ○ Tender & enlarged | ○ Painless & enlarged | ○ Painless & enlarged |
| ○ Firm | ○ Firm, Soft, Hard | ○ Firm |
| ○ Single | ○ Amalgamated (can't be counted) | ○ Discrete & mobile (different size) |
| --- | ○ Infiltration (bad prognosis) | ○ No infiltration but pressure symptoms. |

## Don't forget:

- Lymphadenoid = 2ry T.B
- Lymphadenoma = Hodgkin's disease
- Adenolymphoma = Adenocystic lymphoma (Warthin's tumor) of salivary gland.

# LYMPHADENOPATHY HISTORY

## ❖ Personal history:

1. **Name:** الإسم ثلاثي
2. **Age:**
   - ○ Young : TB
   - ○ Adult : Acute leukemia or Hodgkin (10-30 years).
   - ○ Old : Chronic leukemia or Non Hodgkin (30 - 70 years)
3. **Sex :**
   - ○ Malignancy more common in male.
4. **Occupation:**
   - ○ Brucellosis (in those contact with animal)
   - ○ Because brucellosis → Pel Epstein fever which is similar to Hodgkin's disease.
5. **Marriage.**
6. **Menstrual history if female.**
7. **Residence & address:** T.B (low socioeconomic standard area)
8. **Habits of medical importance:**
   - Alcohol : induces pain at site of Hodgkin's disease
9. **Handedness.**

## ❖ Complaint + duration: إي اللي جابك المستشفى ؟

- ○ Multiple swellings (at anatomical site of L.Ns) ± pain

## ❖ History of present illness = HPI المرض بدأ معاك إزاي , آخر مرة كنت كويس فيها إمتى ؟

### I. Analysis of the complaint : swelling ± pain

**A. Analysis :** OCD, site & side if localized , number if multiple ask about one group, associated other swelling if generalized

**B. Pain if present; analyze :**

❖ ***Causes of painful LN:***

- *Acute lymphadenitis*
- *Late lymphoma*

- OCD, ↑ (e.g. alcohol) , ↓, Associated symptoms
- Character
- Site
- Radiation
- Relation to (meal, respiration, exertion, postural)

### III. Systemic symptoms (general complications)

**A. Toxic manifestations (FHMA):**

- ○ Hectic fever : As in acute lymphadenitis (abscess).
- ○ Night fever : As in T.B. (2ry).
- ○ Glandular fever: [ Fever + rashes ] as in I.M.N.
- ○ Pel Epstein fever = Irregular = periodic: As in Hodgkin

**B. Etiological manifestations ( see introduction)**

- Generalized lymphadenopathy
- Localized lymphadenopathy

### IV. Investigations (Biopsy) & Treatment received .

### II. Pressure (infiltration) symptoms (local complications)

1. **In neck lymphadenopathy**
   - ○ Dyspnea (trachea or larynx).
   - ○ Dysphagia (oesophagus).
   - ○ Horner's syndrome (sympathetic chain ).
   - ○ Face oedema (int. jugular v. compression )
   - ○ Fainting attacks (carotid a. compression)
   - ○ Hoarseness (recurrent laryngeal nerve).
2. **In chest lymphadenopathy:** Chest pain, cough and dyspnea
3. **In axillary lymphadenopathy :**
   - ○ Oedema (Vein compression),
   - ○ Ischemia or gangrene (Arterial compression)
   - ○ Tingling, numbness... (Nerve compression)
4. **In abdominal lymphadenopathy:**
   - ○ Abdominal pain or back pain.
   - ○ Jaundice (L.Ns in porta-hepatis).
   - ○ Leg oedema (compressed iliac veins or I.V.C by iliac & Para-aortic lymph nodes).
   - ○ Renal pain (ureteric compression)
5. **In inguinal lymphadenopathy:** Same as axillary but ask about:
   - ○ Varicose veins of L.L.
   - ○ Claudication pain on walking

## ❖ Past history:

- ○ Similar condition i.e. Recurrence
- ○ Important disease as D.M., hypertension, heart diseases etc.
- ○ Previous operation or biopsy (which L.Ns ?)
  - 🕮 The moderate size because {not big (degenerated) & Not small (no pathology)}
- ○ Previous exposure to irradiation

## ❖ Family history: T.B. may affect members (same environment)

## I. General examination:

**A. Vital signs**

**B. General examination :**

- ○ ill with cachexia as in late lymphoma
- ○ Toxic face as in acute lymphadenitis.
- ○ Under built as in T.B & lymphoma.

**C. Systemic examination:** Examine all accessible L.Ns except the presenting group (in local exam) + detection of the cause.

| ❖ Head | ❖ Neck | ❖ Upper & lower limb |
|---|---|---|
| ○ Skull: for bone metastasis<br>○ Eye : for jaundice (if L.Ns in porta-hepatis)<br>○ Lip: for pallor & cyanosis (if L.Ns in mediastinum).<br>○ Tongue: Paralysis (If infiltration of hypoglossal nerve).<br>○ Parotid region for swelling : Mikulicz (auto-immune) | ○ Thyroid gland: for enlargement, causes :<br>A. toxic goiter (auto-immune)<br>B. Hashimoto's thyroiditis (auto-immune)<br>C. Occult carcinoma<br>○ Trachea : Central or not.<br>○ Carotid pulsation : cervical L.Ns<br>○ Congested neck veins : mediastinal L.Ns<br>○ Other L.Ns : If not the presenting group. | ○ Venous oedema<br>○ Arterial pulsation<br>○ Nervous sensation<br>○ Other L.Ns if not the presenting group |

| ❖ Chest examination | ❖ Abdominal examination | ❖ Neurological examination: |
|---|---|---|
| ○ Bone (chest wall) metastasis.<br>○ Lung (cavitation) as in T.B.<br>○ Sternum (tenderness) as in leukemia.<br>○ Despine's sign: mediastinal L.Ns (see chest) | ○ H.S.M as in leukemia.<br>○ Abdominal organs as in spleen.<br>○ L.Ns if not the presenting group.<br>○ Testis : if testicular tumors<br>💣 N.B.: Seminoma one of occult carcinoma<br>○ PR or PV = for pelvic tumors or nodule in the doglus pouch<br>○ DON'T FORGET (BACK): For metastasis | ○ TB: Pott's disease<br>○ Luekima : infiltrate CNS: paraplegia & optic nerve affection<br>○ Lymphoma: paraplegia & periphral neuritis |

## II. Local examination:

### I. Inspection:

1. **Number:** Single or multiple i.e. localized or generalized
2. **8 S:**

- **Site** (Anatomical site of L.Ns):

| | | | |
|---|---|---|---|
| ○ T.B.: Upper Deep Cervical L.Ns. | ○ Hodgkin: Lower Deep Cervical L.Ns. | ○ 2ry syphilis: Epitrochlear L.Ns. | ○ IMN: Occipital L.Ns |

- **Side** : Rt. or Lt or both
- **Shape :** Oval, rounded or irregular
- **Size :** in … cm x … cm
- **Surface :** Smooth, nodular or lobulated
- **Skin over :**

| | | |
|---|---|---|
| ○ Redness : If acute lymphadenitis. | ○ Infiltration : If lymphoma. | ○ Sinus : If T.B. or cold abscess. |

- **Special sign:**

| | |
|---|---|
| ○ Transmitted pulsation : If para-aortic L.Ns. | ○ Moving up & down : If pre-tracheal L.N |

- **Other swellings:**

○ If generalized lymphadenopathy look for other L.Ns all over the body.

○ If localized lymphadenopathy look for infectious or malignant focus at draining area.

↳ **In cervical lymphadenopathy :** Examine (oral cavity).
{Tongue, teeth, cheek, lips, tonsil, thyroid, face, scalp, parotid, pharynx & larynx}

↳ **In axillary lymphadenopathy :** Examine breast, upper limbs, anterior wall of the trunk until level of umbilicus & posterior wall of the trunk until level of umbilicus

↳ **In supra-clavicular L.Ns (Virchow's gland):** above clavicle

↳ **In inguinal L.Ns :** Examine lower limbs, genetalia, perineum, anal canal, gluteal region & anterior abdominal wall below level of umbilicus.

3. **Edge :** well or ill defined (or difficult to be seen)
4. **Distal effect:** oedema, colour changes & trophic changes , deformity

## II. Palpation: (technique for palpation : before)

1. **Temperature :** warm as in acute lymphadenitis
2. **Tenderness :** tender as in acute lymphadenitis
3. **Mobility of LNs to each other:**

- **Discrete :** 2ry TB & early Hodgkin
- **Matted :** 1ry TB, fused & can be counted
- **Chain :** TB
- **Amalgamated :** Non Hodgkin, fused & can’t be counted

4. **8 S:**

- **Site, side, shape , size, surface :** to confirm the inspection
- **Skin over:** To show if swelling attached to skin or not) by
  - Sliding the skin or pushing mass under skin: If puckering = infiltrated = lymphoma.
- **Special sign :** to confirm the inspection
- **Other swelling :** as inspection

5. **Edge :** well or ill defined
6. **Consistency :**

| | | | |
|---|---|---|---|
| ○ Hard: Calcified 1ry T.B. or Non Hodgkin | ○ Soft: Degenerated non Hodgkin | ○ Cystic: Cold abscess | ○ Firm: Acute lymphadenitis, 1ry T.B., 2ry T.B. & lymphoma |

7. **Deep structure :** Relation to deep muscle
8. **Distal effect:** oedema, colour changes & trophic changes , deformity

III. **Percussion :** sternum for mediastinal mass & tenderness as in leukemia

IV. **Auscultation :** Despine’s sign (mediastinal LN) : see chest

## ❖ Discussion :

1. **How can you examine 'matted' T.B L.Ns ?**

- **Hold 2 adjacent L.Ns, one on each hand than move them in opposite directions -» never separated.**

2. **What is the cause of 'Rosary beads' ?**

- **Lymphangitis + lymphadenitis**

3. **What is the surgical importance of supraclavicular L.Ns ?**

↳ **Lt. supra-clavicular L.Ns :**

- **Below diaphragm (Cancer stomach, cancer colon & hypernephroma)**
- **Above diaphragm (Lt. cancer breast & Lt. bronchial carcinoma)**

↳ **Rt. Supra-clavicular L.Ns:**

- **Below (Bare area of liver only).**
- **Above (Rt. cancer breast only).**

4. **What are roles of 'Waldeyer's'?**

- **Waldeyer's ring.**
- **Waldeyer's ligament.**
- **Fascia of rectum.**
- **Fascia of lower 1/3 ureter.**

5. **How can you DD between submandibular gland & L.Ns ?**

- **Submandibular L.Ns only rolled on lower border of mandible.**

6. **How can you DD between parotid gland & L.Ns ?**

- **It is very difficult so → Biopsy must be done.**

7. **What Is the value of occipital L.Ns enlargement ?**

- **Enlarged with IMN (glandular fever)**

  → **N.B.: Don't Forget:**

  - **Spinal accessory L.Ns enlarged with pediculosis & frunculosis.**
  - **Jugulo-omohyoid L.Ns enlarged with Cancer tongue.**
  - **Jugulo-digastric L.Ns enlarged with tonsiller diseases "tonsiller L.Ns"**

8. **What is the value of epitrochlear L.Ns enlargement ?**

- **Enlarged with 2ry syphilis.**

9. **Where are L.Ns arranged along [Arteries, veins & nerves] ?**

  - **L.Ns arranged along veins : [Limbs and head & neck]**
  - **L.Ns arranged along arteries : [Abdomen]**
  - **L.Ns arranged along nerves:**
  - **Epitrochlear L.Ns [ulnar nerve],**
  - **Accessory L.Ns [spinal accessory nerve]**
  - **L.Ns along [Lat. popliteal nerve**

10. **Which LN enlargement means Generalized lymphadenopathy ?**

  - **Epi-trochlear LN (above medial epicondyle of humerus )**

11. **Which LN could be examined by stethoscope?**

  - **Interbronchial LN ( D'spine sign in chest )**

## 2ry T.B. sheet

- **Personal history: …**
- **Complaint :** Multiple bilateral swellings in the neck, axilla & groin 2 years ago
- **HPI:**
  - The condition is started by multiple, bilateral, painless swellings in the **upper part of the neck** 2 years ago by gradual onset & slowly progressive course.
  - The condition was associated with **night sweat, night fever, loss of weight & loss of appetite**
  - 2 days later multiple, bilateral swellings appeared in both **axilla.**
  - 7 days later multiple, bilateral swelling appeared in both **groin.** The patient was admitted to Abbasia fever hospital for 7 days & investigated by urine, stool, CBC and chest X-ray & received medical treatment and fever disappearedd.
  - The patient is still complaining with dyspnea and cough, so admitted to chest hospital and received medical treatment. The symptoms disappeared but the swellings persist so admitted also to National cancer institute & received medical treatment in form of (4 types of drugs) so swelling decreased in size and persist until now.
  - There are bilateral varicose vein & Rt. side hernia
  - No symptoms suggesting pressure in **axilla** : in form of oedema, tingling numbness or claudication pain.
  - No symptoms suggesting pressure in **groin** : same as axilla.
  - No symptoms suggesting pressure inside **abdomen** : In form of renal pain jaundice or leg oedema.
  - No symptoms suggesting **causes** as : Leukemia (bleeding tendency), 2ry syphilis (Skin rashes with genital ulcer) or IMN (skin rashes & glandular fever).
- **Past history :**
  - No past history about recurrence, No DM, No hypertension, No T.B, No Bilharziasis
  - There past history about Lt. side hernia operation
- **Family history :** No family history of similar condition (irrelevant)

**❖ Diagnosis :Generalized lymphadenopathy most probably $2^{ry}$ T.B**

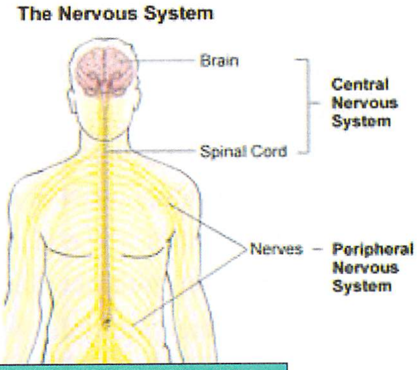
## Hodgkin's lymphoma

- **Personal history: …**
- **Complaint :** Multiple bilateral swellings in the neck, axilla & groin 6 years ago
- **HPI:**
  - The condition is started by multiple, bilateral, painless swellings in the **upper part of the neck** 6 years ago by gradual onset & slowly progressive course.
  - At 1st appears in the neck then **axilla** & finally **groin** 1 week from the onset.
  - The condition is associated by **fever 1 week & disappeared 10 days then returned in same manner.**
  - The patient was admitted to Demrdash hospital & was investigated by C.B.C, CT chest, bone marrow aspiration from sternum & L.Ns biopsy from axilla, then received medical treatment in form of chemotherapy, so the patient's hair lost as complication.
  - No symptoms suggesting pressure in **axilla:** In form of oedema, tingling, numbness or claudication pain.
  - No symptoms suggesting pressure in **groin :** Same as axilla
  - No symptoms suggesting pressure inside **abdomen :** In form of renal pain, jaundice or leg oedema.
  - No symptoms suggesting **causes** as : Leukemia (bleeding tendency), 2ry syphilis (Skin rashes with genital ulcer) or IMN (skin rashes & glandular fever)
- **Past history :**
  - No past history about recurrence, No DM, No hypertension, No T.B, No Bilharziasis
- **Family history :** No family history of similar condition (irrelevant)

**❖ Diagnosis :Generalized lymphadenopathy most probably Hodgkin's lymphoma**

# NEUROLOGY

## ❖ Classifications of nervous system:


The Nervous System
Brain
Spinal Cord
Central Nervous System
Nerves
Peripheral Nervous System

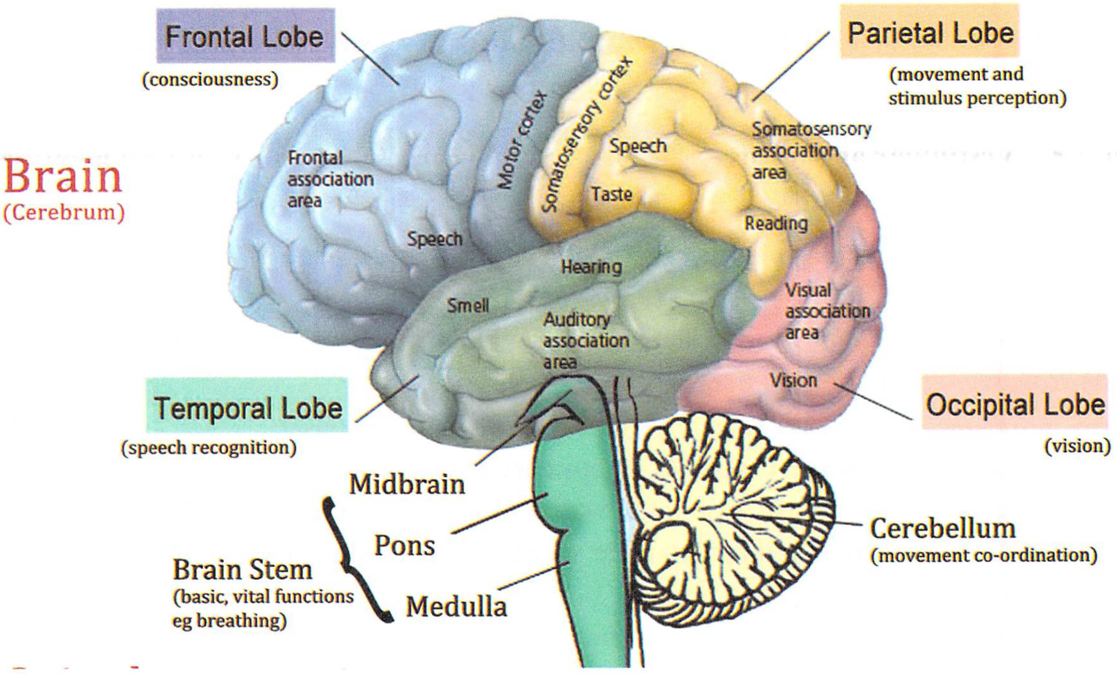
**A. Functional classification (Neurophysiology):**

- ○ Autonomic function : parasympathetic & sympathetic nervous system
- ○ Somatic function :motor system & sensory system
- ○ Psychological function.

**B. Structural classification (Neuroanatomy):** central & peripheral nervous system

| 1. Central nervous system (CNS) | | 2. Peripheral nervous system (PNS) | |
|---|---|---|---|
| A. Brain : | B. Spinal cord | A. Spinal nerves | B. Cranial nerves |
| ❁ Cerebrum<br>❁ Cerebellum<br>❁ Brain stem :<br>- Midbrain<br>- Pons<br>- Medulla | ❁ 31 segments | ❁ Number | |
| | | 31 pairs | 12 pairs |
| | | ❁ Origin | |
| | | Spinal cord | Brain & its stem |
| | | ❁ Exit | |
| | | Vertebral column | Skull (cranium) |
| | | ❁ Supply | |
| | | • Cervical : UL<br>• Thoracic : trunk<br>• Lumbar: LL<br>• Sacral : LL<br>• Coxygeal : perineum | • Head & neck |

## Central nervous system (CNS)


Brain
(Cerebrum)
Frontal Lobe
(consciousness)
Parietal Lobe
(movement and stimulus perception)
Frontal association area
Motor cortex
Somatosensory cortex
Speech
Taste
Somatosensory association area
Reading
Speech
Hearing
Smell
Auditory association area
Visual association area
Vision
Temporal Lobe
(speech recognition)
Occipital Lobe
(vision)
Midbrain
Pons
Medulla
Brain Stem
(basic, vital functions eg breathing)
Cerebellum
(movement co-ordination)

### A) Brain:

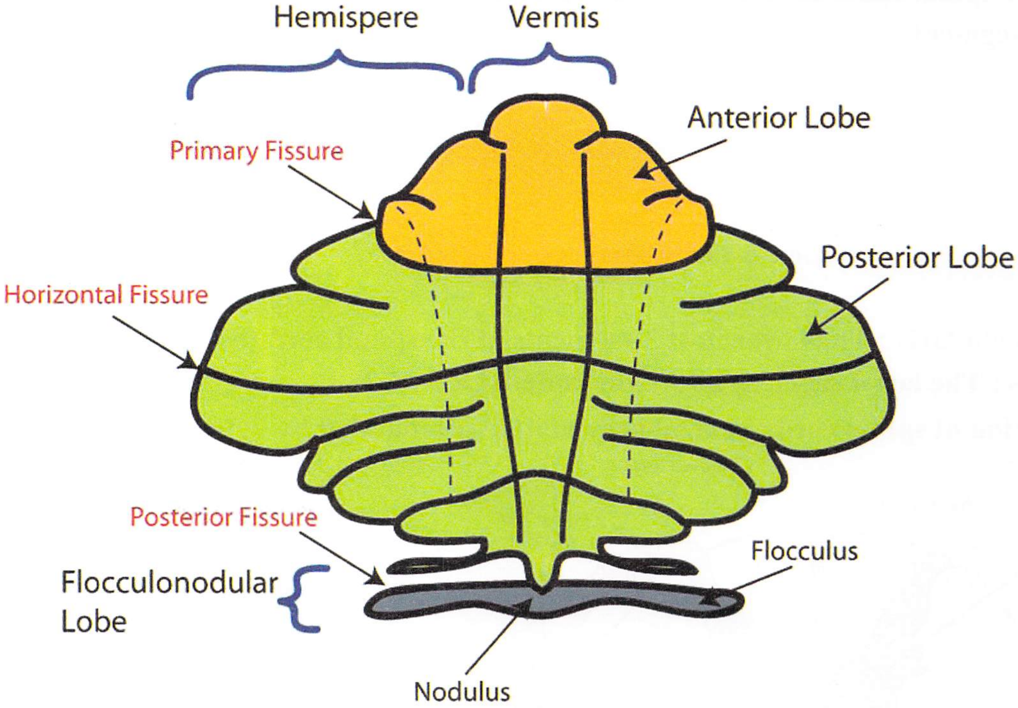
**I. Cerebrum:**

- ❁ It is formed of 2 cerebral hemispheres, connected to each other by the corpus callosum, and to the upper part of the brain stem by the 2 cerebral peduncles.
- ❁ The surface of each hemisphere is divided into 4 lobes:

| 1. Frontal | 2. Parietal | 3. Temporal | 4. Occipital |
|---|---|---|---|

## I. Cerebellum :

- **Site :** It lies behind the Brain Stem and occupies most of the posterior cranial fossa


Hemispere
Vermis
Anterior Lobe
Primary Fissure
Posterior Lobe
Horizontal Fissure
Posterior Fissure
Flocculus
Flocculonodular Lobe
Nodulus

- **Anatomy:** the cerebellum is formed of 2 main parts:

1. A midline central structure, known as the vermis.
2. Two lateral cerebellar hemispheres.

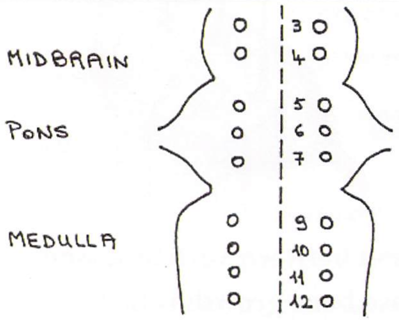
**The cerebellum can also be divided in the following manner:**

| | | |
|---|---|---|
| 1. Flocculo-nodular lobe | 2. Anterior lobe | 3. Posterior lobe |

- **Phylogeny :**

| | A. Archicerebellum | B. Paleo-cerebellum | C. Neocerebellum |
|---|---|---|---|
| Anatomy | ▪ Flocculo-nodular lobe | ▪ Anterior lobe | ▪ Posterior lobe |
| Development | ▪ The earliest development | ▪ The Next one | ▪ The most recent |
| Function | ▪ Maintenance of equilibrium | ▪ Maintenance of muscle tone | ▪ Coordination and regulation of the fine delicate voluntary motor activity |
| Connection to | ▪ Vestibular apparatus | ▪ Spinal cord | ▪ Cerebral hemispheres |
| Connection through | ▪ Vestibulo-cerebellar and cerebello-vestibular tracts | ▪ Spino-cerebellar tracts. | ▪ Dentato-rubro-thalamo-cortical tract. |
| Lesion | ▪ Disturbance of equilibrium:<br>- Trunkal ataxia on standing<br>- Drunken gait on walking | ▪ Disturbance of the muscle tone (hypotonia) | ▪ Incoordination of movements. |

## I. Brain stem:

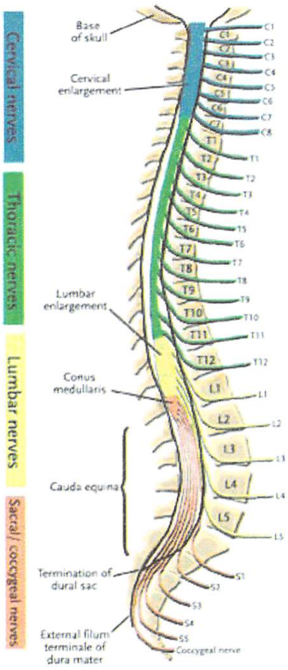

MIDBRAIN
PONS
MEDULLA
3
4
5
6
7
9
10
11
12

| It is formed of: | Midbrain | Pons | Medulla |
|---|---|---|---|
| Motor nuclei of | CN 3 , 4 | CN 5, 6 , 7 | CN 9, 10, 11 , 12 |

- It is connected to the cerebral hemispheres by 2 cerebral peduncles and to the cerebellum, on each side, by the superior, middle & inferior cerebellar peduncles.
- It contains groups of nerve cells (gray matter) intermingled with several ascending and descending fibers (white matter)

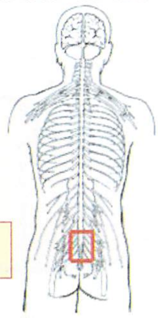
> **N.B. :**
>
> - CN: 1, 2 & 8 are sensory nerves having no motor nuclei, they concerned with special sensations, perceived in special areas of the cerebral cortex.

## B) Spinal cord:

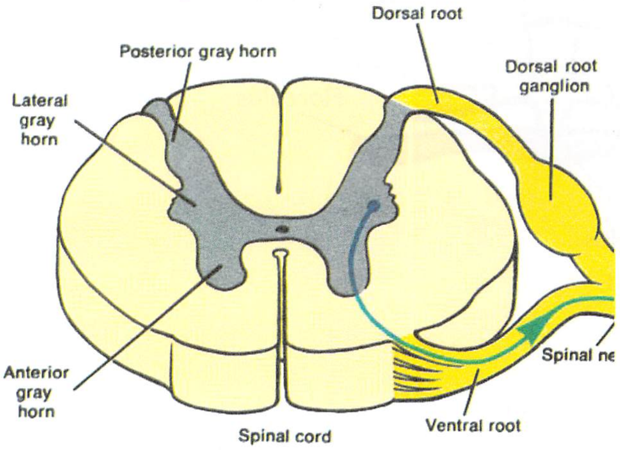

Cervical nerves
Thoracic nerves
Lumbar nerves
Sacral/ coccygeal nerves
Base of skull
Cervical enlargement
Lumbar enlargement
Conus medullaris
Cauda equina
Termination of dural sac
External filum terminale of dura mater
C1
C2
C3
C4
C5
C6
C7
C8
T1
T2
T3
T4
T5
T6
T7
T8
T9
T10
T11
T12
L1
L2
L3
L4
L5
S1
S2
S3
S4
S5
Coccygeal nerve

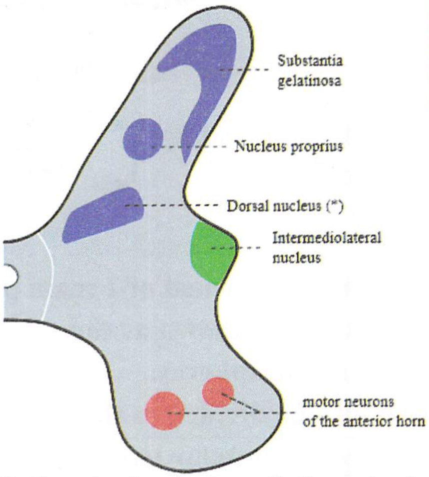
- **Site:** It lies in the spinal canal & ends at the lower border of the 1st lumbar vertebra.
- **Formed of :** 31 segments.
- 8 cervical
- 12 thoracic
- 5 lumbar
- 5 sacral
- 1 coxygeal
- N.B.:
  - **Conus medullaris :** The lowermost 3 segments of the spinal cord (S3, 4, 5) (S3,4,5)
  - **Epiconus :** The last 4 segment above the conus (L4,5,S1,2)

Conus medullaris →



- **Transverse section of spinal cord :** central grey matter surrounded by outer white matter:


Dorsal root
Posterior gray horn
Dorsal root ganglion
Lateral gray horn
Spinal ne
Anterior gray horn
Spinal cord
Ventral root

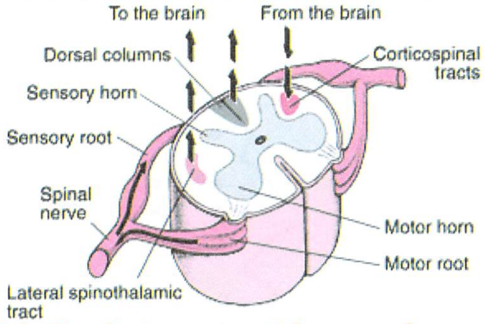

Substantia gelatinosa
Nucleus proprius
Dorsal nucleus (*)
Intermediolateral nucleus
motor neurons of the anterior horn

1. **Grey matter contains nerve cells:** arranged in H-shaped with 2 anterior horns & 2 posterior horns:

| A. Anterior horn | B. Posterior horn |
|---|---|
| ○ It's nerve cell bodies called anterior horn cells (AHC) | ○ It's nerve cell bodies at the end called substantia gelaintosa of Rolandi (SGR) |
| ○ Has motor function | ○ Has sensory function |
| → The fibers of grey matter extend outside the spinal cord forming the spinal nerves: | |
| ○ Gives ventral (anterior) root of spinal nerve | ○ Receives dorsal (posterior) root of spinal nerve |

> N.B.: lateral horn presents only in the thoracic & upper lumbar segments , has sympathetic function through sympathetic ganglion

2. **White matter contains nerve fibers** which forms ascending & descending nerve fibers arranged in tracts :


To the brain
From the brain
Dorsal columns
Corticospinal tracts
Sensory horn
Sensory root
Spinal nerve
Motor horn
Motor root
Lateral spinothalamic tract

| A. Ascending tracts: | B. Descending tracts: |
|---|---|
| ○ Lateral spinothalamic | ❖ Pyramidal: Corticospinal |
| ○ Ventral spinothalamic | ❖ Extra-pyramidal: |
| ○ Gracile & Cuneate | ○ Reticulospinal |
| ○ Spinocerebellar | ○ Vestibulospinal, Tectospinal |
| ○ Lissauer's tract | ○ Rubrospinal, Olivospinal |

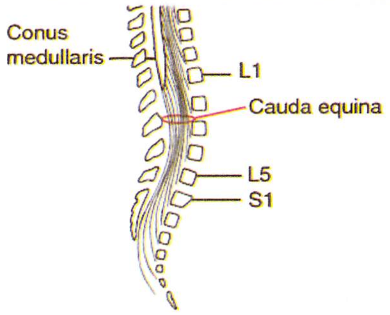
- **Relation between vertebrae and corresponding spinal cord segment :**

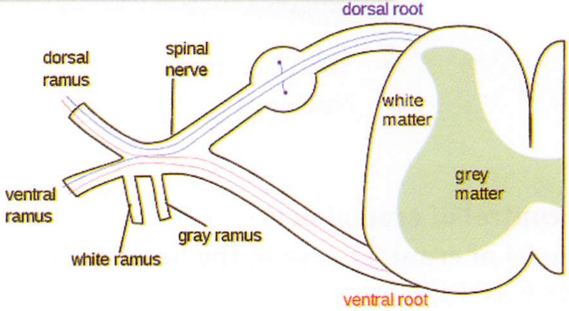
- Because bone growth is faster than soft tissue growth, vertebral column is longer than spinal cord which ends at L1 vertebra, So not every vertebra is opposite it's corresponding segment

| ❖ Spinal cord segment | ❖ Vertebral column |
|---|---|
| ○ From C1-C4 | ○ Subtract 1 |
| ○ From C5-T6 | ○ Subtract 2 |
| ○ From T7 – L2 | ○ Subtract 3 |
| ○ L3, L4 | ○ Opposite T12 |
| ○ L5 & sacral segments | ○ Opposite L1 |
| - E.g.<br>○ Superior abdominal reflex = T10 Cord = T7 vertebra<br>○ Ankle reflex = S1 cord = L1 vertebra | |

# Peripheral nervous system (PNS)

## A. Spinal nerves:





- **Number:** 31 pairs
- **Cauda equine:** last 10 spinal nerves "lumbosacral roots" which fill the lower part of the spinal canal below the lower border of L1 because spinal cord is shorter than vertebral column
- **Formation:** each spinal nerve is formed by the combination of nerve fibers from the dorsal (posterior) and ventral (anterior) roots of the spinal cord.
- **Type:** mixed nerve
- **Function :**

### A. Somatic function:

| 1. Ventral (anterior) root | 2. Dorsal (posterior) root |
|---|---|
| ○ Composed of motor fibers "axons of AHCs" | ○ Composed of sensory fibers |
| ○ Its cell bodies lie in specific areas of the spinal cord itself. | ○ Its cell bodies lie in a spinal ganglion (dorsal = posterior root ganglion) that is outside the spinal cord |

### B. Autonomic function :

- ○ Sympathetic fibers through thoracolumbar spinal nerves (T1-L2 levels)
- ○ Parasympathetic fibers in sacral plexus (S2, S3 and S4 levels)

## B. Cranial nerves = CN

- **Number:** 12 pairs

| | |
|---|---|
| 1. Olfactory | 2. Optic |
| 3. Oculomotor | 4. Trochlear |
| 5. Trigeminal | 6. Abducent |
| 7. Facial | 8. Vestibule-cochlear |
| 9. Glossopharyngeal | 10. Vagus |
| 11. Accessory; has 2 part:<br>- Cranial part<br>- Spinal part | 12. Hypoglossal |

→ N.B.: Groups :

| ▪ Ocular group | ▪ Bulbar group |
|---|---|
| CN 3, 4, 6 | CN 9, 10, 11, 12 |

- **Function:** Nerve supply to head & neck

### A. Somatic Function :

| 1. Pure sensory nerves: special senses | 2. Pure motor nerves | 3. Mixed nerves |
|---|---|---|
| ○ CN 1 : smell<br>○ CN 2 : vision<br>○ CN 8 :hearing | ○ CN: 11, 12, Ocular group (3, 4, 6) | ○ The others |

### B. Autonomic function:

- ○ Sympathetic supply through sympathetic chain
- ○ Parasympathetic supply through parasympathetic ganglions

→ N.B.: Cranial nerves act on 2 types of muscles in head & neck

| 1. Pulling muscles | 2. Pushing muscles |
|---|---|
| ○ Mouth : Retractor anguli | ○ Tongue لسان |
| ○ Uvula : Muscles of uvula | ○ Mandible فك |
| ↳ If both of them are intact : target in the middle | |
| ↳ If one of them is weak : deviation : | |
| ○ Deviation to the normal (healthy side) | ○ Deviation to the diseased side فكسان عيان |

❖ **Nuclei of cranial nerves:**

- All CN have nuclei in the brain stem
- Except CN 1, 2 emerge from cerebrum so they are not considered CN but they are considered as tracts

| ❖ Brain stem | | |
|---|---|---|
| ▪ Mid brain : | ▪ Pons | ▪ Medulla |
| ○ Nuclei of 3, 4 | ○ nuclei of 5, 6, 7, 8 | ○ nuclei of 9, 10, 11, 12 |

❖ **Cortical control of cranial nerve :**

- **Motor nuclei of cranial nerve in the brainstem receive fibers from Cortico-bulbar tract of pyramidal tract of both sides EXCEPT :**

- **Lower part of CN 7**
- **CN 12 ( unilateral pyramidal supply in 50 % of people)**
  - → **Which have unilateral pyramidal fibers from the opposite side**

❖ **Lesion of CN are either :**

- **Upper Motor Neuron Lesion (UMNL) : pyramidal lesion**
- **Lower Motor Neuron Lesion (LMNL) : nucleus , nerve, muscle**

❖ **Golden rule :**

→ **Unilateral paralysis in a CN with bilateral pyramidal tract supply is LMNL**

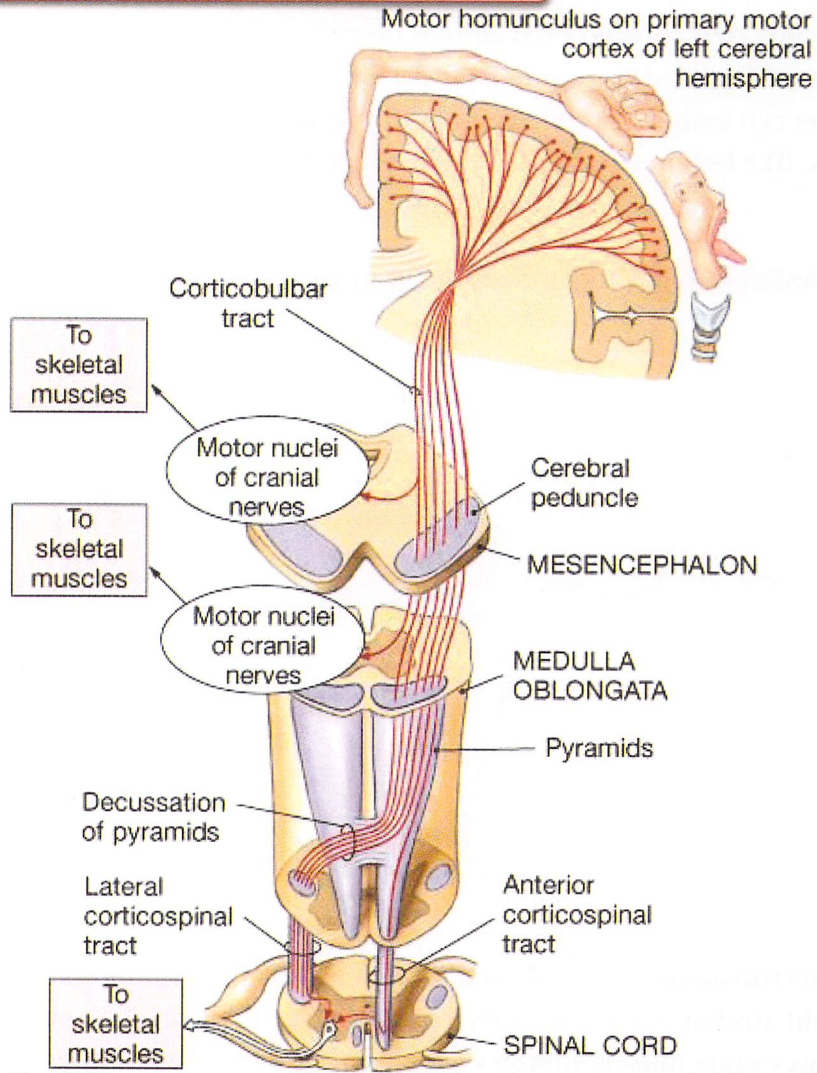
## Motor system; consists of 4 main components:

| 1. Pyramidal (Δ) System (U.M.N.) | 2. Extrapyramidal (extra Δ) System | 3. Cerebellar System | 4. Lower Motor Neuron (L.M.N.) |
|---|---|---|---|
| ❖ Origin | | | |
| ▪ It originates in the motor area (4) & premotor area (6)<br>▪ Terminates at the anterior horn cells (A.H.C.) of the different levels of the spinal cord | ▪ It originates from centres situated at various levels of C.N.S. mainly the Basal Ganglia | ▪ It is composed of the Neo, Archi & Paleo-cerebellum | ▪ It is formed of A.H.C.s & peripheral motor nerves |
| ❖ Control: | | | |
| ▪ Opposite half of the body. | ▪ Opposite half of the body. | ▪ Same half of the body. | ▪ Same half of the body. |
| ❖ Function: | | | |
| ▪ Initiation of voluntary motor activity<br>▪ Inhibition of muscle tone<br>▪ Inhibition of deep reflex | ▪ Regulation of voluntary motor activity<br>▪ Regulation of muscle tone<br>▪ Regulation of emotional & associative movement | ▪ Coordination of voluntary motor activity<br>▪ Regulation of muscle tone<br>▪ Regulation of equilibrium | ▪ Transmit the motor impulses to the voluntary muscles |

## Upper & lower motor neuron systems = Pathway of voluntary motor impulse

- **For a voluntary muscle to move, a nerve impulse originates from the opposite motor area to pass into main neurons UMN ( Δ tract) & LMN**

## 1. Upper Motor Neurone (U.M.N.) = pyramidal tract


Motor homunculus on primary motor cortex of left cerebral hemisphere
Corticobulbar tract
To skeletal muscles
Motor nuclei of cranial nerves
Cerebral peduncle
To skeletal muscles
MESENCEPHALON
Motor nuclei of cranial nerves
MEDULLA OBLONGATA
Pyramids
Decussation of pyramids
Lateral corticospinal tract
Anterior corticospinal tract
To skeletal muscles
SPINAL CORD

- **Origin:** Betz (pyramidal) cells of the motor area (area 4) & to a lesser extent in the cells of the premotor area (area 6).
- **Pathway :**

1. Axons of these cells descend in the depth of the cerebral hemisphere in the corona radiata
2. Pass in the internal capsule (genu & ant. 2/3 of posterior limb)
3. Continue their descent in the midbrain, pons & medulla in the brain stem, some of pyramidal tract leave it to supply motor nuclei of the cranial nerves of both sides except the lower half of the facial nucleus & the hypoglossal nucleus (in 50% of people) which are supplied only from the opposite Δ tract.

→ These fibers are known as corticobulbar as they do not reach the spinal cord.

4. In the lower medulla, 80% of the fibers decussate to descend in the white matter of the opposite side of the spinal cord, while the remaining fibers (20%) descend directly in the white matter of the same side.

→ This pathway starting from the cells of the cortex down to the spinal cord is known as the pyramidal Tract.

→ The fibers of the pyramidal tract terminate at different levels of the A.H.C.s of the spinal cord is known as Corticospinal tract

- N.B.:
  - Body is represented in motor area 4 (precentral gyrus) upside down, with the face at lower part & foot at the top
  - Skilled & complex movements e.g. Those involving speech, face & hands are specially widely presented

## 2. Lower Motor Neurone (L.M.N.)

1. A.H.C.s:

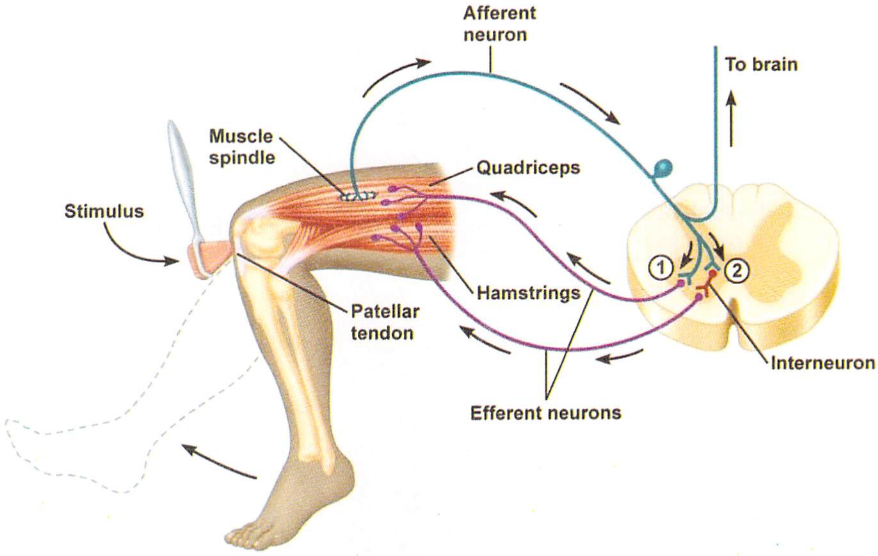
- They receive the voluntary motor impulse from the Δ tract.

2. Peripheral Motor Nerve carrying the motor impulse from A.H.C. to the voluntary muscle through motor end plate

❖ N.B.:

- Spinal cord AHCs receive pyramidal fibers from contralateral side only
- The motor nuclei of the cranial nerves are similar in function to the A.H.C., as they form the cell bodies of the L.M.N. of the cranial nerves. Thus, lesion of a cranial nerve nucleus, like lesion of an A.H.C. is a L.M.N. lesion.

**To know the UMN lesion & LMN lesion, we should understand the control of muscle tone & stretch reflex first.**



## ❖ Muscle tone :

- This is a spontaneous (involuntary) local axon stretch reflex.
- Due to constant slight stretch of muscle as its length shorter than the distance between its origin & insertion.
- This stretch stimulates some muscle spindles which send excitatory impulses through the afferent sensory nerve & the dorsal root to the A.H.C.
- The A.H.C.s send motor impulses through the anterior root & the efferent motor nerve to the muscle.
- This results in continuous reflex subtetatinic contraction of the muscle = Muscle Tone
- Function of muscle tone: which is important for the nourishment of the muscles & the posture of the body.

## ❖ Tendon Jerk (Deep Reflex):

- This is an induced local axon stretch reflex.
- It is induced by tapping the tendon of the muscle with a hammer. This tap stretches the muscle with synchronous stimulation of all muscle spindles & activation of the local axon reflex (as in Muscle Tone), resulting in a brief contraction of the muscle.

## Control of muscle tone & stretch reflex :

- Both are inhibited by higher control, through the pyramidal & extrapyramidal systems.

## Lesion:

- U.M.N.L (Δ Lesion) results in loss of inhibition of the intact reflex arc leading to increased muscle tone (hypertonia; spasticity or rigidity) & exaggeration of deep reflexes (hyperreflexia) below the level of the lesion with no wasting of the muscle.
- L.M.N.L. results in interruption of the reflex arc leading to decreased muscle tone (hypotonia; flaccidity) & diminution of deep reflexes (hyporeflexia) at the level of the lesion, with wasting of the muscles.

## ❖ Clonus:

- Occurs in severe Δ lesion (stretch reflex arc is no longer inhibited)
- Organic Clonus: Induced by sudden sustained stretch of muscle tendon, resulting in a series of rhythmic contractions. It stops with relief of tendon stretch.
- Elicited in ankle, patella & wrist.
- Should be differentiated from hysterical clonus: where it continues after relief of tendon stretch

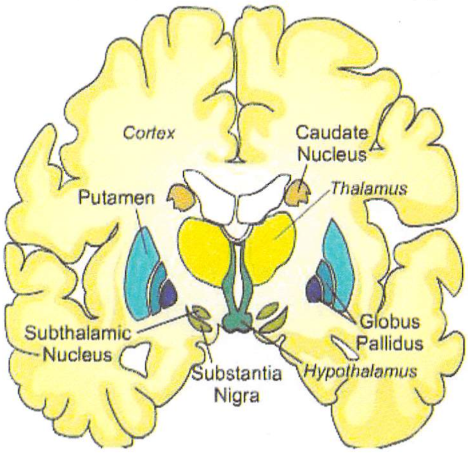
## ❖ UMNL & LMNL:

| | UMNL | LMNL |
|---|---|---|
| | ❖ Lesion | |
| | • Pyramidal tract lesion | • Lesion of AHC or peripheral nerve or posterior root or muscle . |
| | ❖ Weakness | |
| ○ Effect | • Paralysis or weakness<br>• Loss of skilled voluntary movement | • Paralysis or weakness<br>• Loss of all movements |
| ○ Site | • Below the level of the lesion | • At the level of the lesion |
| ○ Distribution | • Distal > Proximal<br>• Progravity > antigravity<br>• Abductors > adductors | • All muscles supplied |
| | ❖ Tone | |
| ○ Effect | • Hypertonia "release phenomenon" (spasticity) " clasp knife" | • Hypotonia (flaccidity) |
| ○ Site | • Below the level of the lesion | • At the level of the lesion |
| ○ Distribution | • Adductors > abductors<br>• Antigravity > Progravity | • All muscles supplied |
| | ❖ Reflexes | |
| ○ Superficial | - UMNL above level of segmental supply of reflex | - LMNL affecting the reflex arc itself |
| ○ Deep | • Hyperreflexia below the level of the lesion | • Hyporeflexia at the level of the lesion |
| ○ Pathological | • Present | • Absent |
| ○ Clonus | • may be present | • Absent |
| ○ Plantar reflex | • Extensor response = Babinski sign | • Flexor response =Normal response |
| ❖ Atrophy | ❖ No or disuse atrophy :<br>○ Late<br>○ Slight<br>○ Diffuse | ❖ Yes:<br>○ Early<br>○ Marked<br>○ Localized |
| ❖ Trophic changes | • Never | • ± |
| ❖ Fasciculations | • Never | • ± (affection of AHCs i.e. irritative lesion) |

## Extra-pyramidal system

❖ **Definition:** It includes all fibers that can influence the motor end plate activity and do not pass in the pyramidal tract.

❖ **This system is formed of the following areas:**



1. **Cortical level:** all lobes share but mainly in the frontal lobe.
2. **Telencephalic level (Basal ganglia):** including the caudate nucleus and the lentiform nucleus (which is formed of the globus pallidus and the putamen).
3. **Diencephalic level:** thalamus, hypothalamus and subthalamus.
4. **Mesencephalic level (Midbrain):** red nucleus and substantia nigra.
5. **Pontine level:** pontine reticular nuclei.
6. **Cerebellar level.**

| ❖ **Functions of the extrapyramidal system** | ❖ **Lesion of extrapyramidal system:** |
|---|---|
| • Regulation and integration of voluntary motor activity. | • **Hyperkinesia** i.e. **static tremors** which may be of two main types:<br>○ Rhythmic and regular as in Parkinsonism.<br>○ Dysrhythmic and irregular as in chorea, athetosis and dystonia.<br>→ N.B.: These tremors increase with emotional stress, anxiety and fatigue and disappear during sleep and during active voluntary movements. |
| • Regulation and maintenance of the muscle tone. | • **Hypertonia** = rigidity in parkinsonism<br>• **Hypotonia** in chorea<br>• **Alteration** of hyper & hypotonia in athetoses & dystonia |
| • Regulation and maintenance of emotional and associative movements. | • **Reduction** : mask face in parkinsonism<br>• **Exaggerated** (excess grimacing) in chorea |

## Sensory system

❖ **Sensations, in general are classified into:**

1. **Somatic sensations:** are conducted to the CNS via somatic nerves; they include:

A. **Superficial sensations:** Pain, Temperature, Touch.

B. **Deep sensations (Proprioceptive):**

- Vibration sense, Joint sense, Muscle sense, Nerve sense.

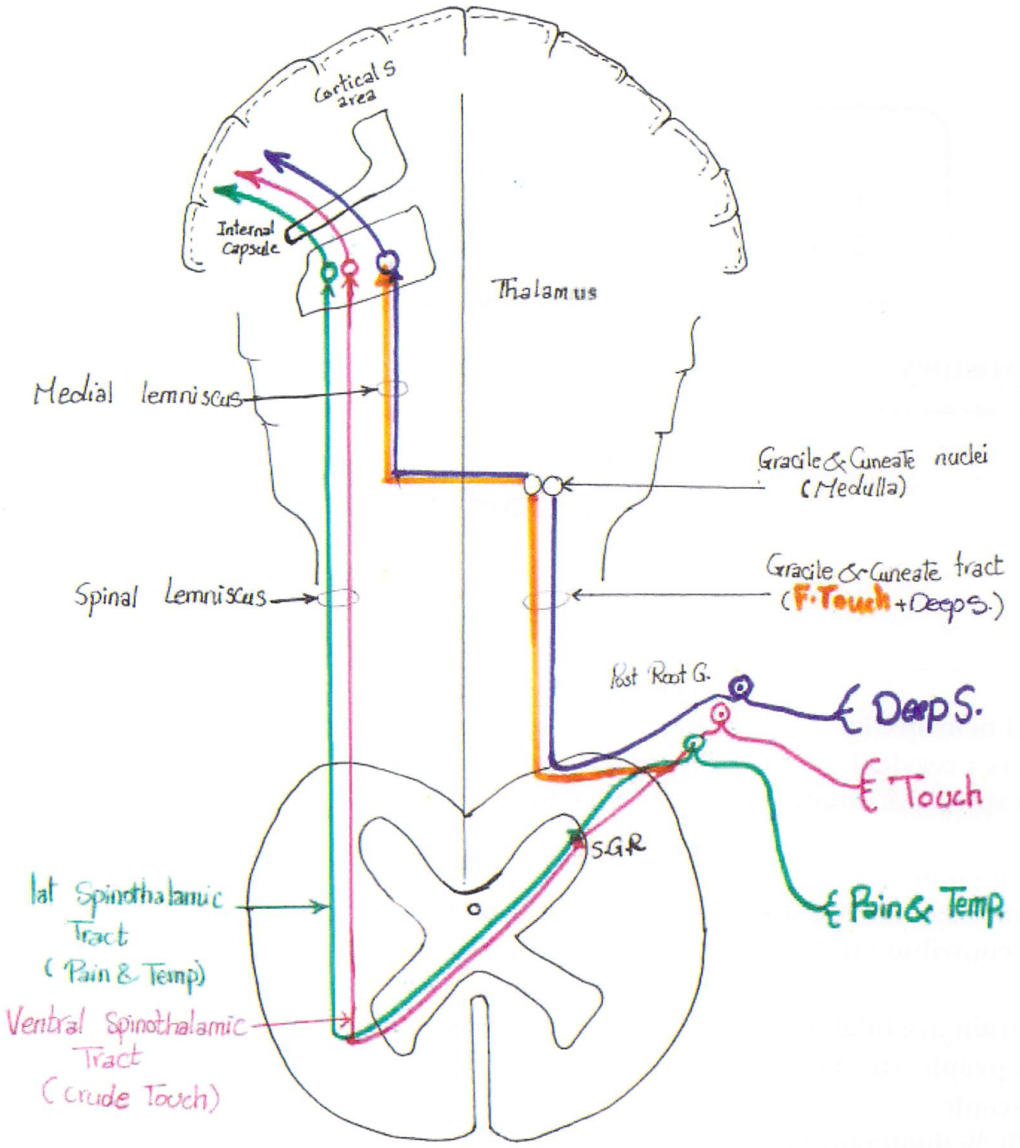
C. **Cortical sensations:**

  - Tactile localization, 2 points discrimination, Stereognosis, Graphosthesia, Perceptual rivalry

2. **Visceral sensations:** all sensations from internal viscera reaching the CNS via the autonomic nerves.

3. **Special sensations:** including vision, hearing, smell & taste reaching the CNS via the cranial nerves.

❖ **Pathway of superficial & deep sensations:**


Cortical S area
Internal Capsule
Thalamus
Medial lemniscus
Gracile & Cuneate nuclei (Medulla)
Spinal Lemniscus
Gracile & Cuneate tract (F.Touch + Deep S.)
Post Root G.
Deep S.
Touch
SGR
Pain & Temp
lat Spinothalamic Tract (Pain & Temp)
Ventral Spinothalamic Tract (Crude Touch)

| | Superficial sensations | | | A. Deep sensations |
|---|---|---|---|---|
| ○ **Type of sensation:** | **Pain, Temperature** | **Crude "simple" touch** | **Fine touch** | • **Vibration sense, Joint sense, Muscle sense, Nerve sense.** |
| ○ **Receptors in** | **Skin** | | | **Deep structures** |
| ○ **1st order neuron** | ▪ **The cell of the Posterior root ganglion & it's axon.**<br>▪ **This axon is divided into :**<br>- **The lateral branch forms the afferent sensory never .**<br>- **The medial branch enters the spinal cord to ascend a few segment forming …** | | | |
| | ❀ **Lissauer's tract** | | ▪ **Gracile & Cuneate tracts within the posterior column of the same side (along with fibers carrying fine touch)**<br>➯ **Gracile Tract: carries fibers from lower ½ of body and lies medially.**<br>➯ **Cuneate Tract: carries fibers from upper ½ of body and lies laterally** | |
| ○ **Site of relay of 1st order neuron** | ▪ **SGR** | | ▪ **Gracile & Cuneate nuclei in medulla** | |
| ○ **2nd order neuron** | ▪ **Cells of Substantia Gelatinosa of Rolandi (S.G.R.) in the post horn of the spinal cord** | | ▪ **Gracile & Cuneate nuclei in medulla** | |
| ○ **Crossing to opposite side in :** | **Spinal cord** | | **Medulla** | |
| ○ **& ascend in … Tract** | **Lateral spinothalamic** | **Ventral spinothalamic** | **Gracile & Cuneate** | |
| ○ **Then in … Lemniscus in brain stem.** | **Lateral** | | **Medial** | |
| ○ **3rd order neuron:** | ▪ **Thalamus of the opposite side area 1, 2, 3 in parietal lobe** | | | |
| ○ **End in:** | ▪ **Cortical sensory area of the opposite side** | | | |

# NEUROLOGICAL HISTORY

❖ Aim of history in neurology → full diagnosis
1. Main diagnosis (lesion) : from HPI
2. Etiology : From Personal , HPI, Past & Family History

## A. Personal History

1. **Name:** الإسم ثلاثي

2. **Age:**
   - ○ Young age: myopathy, embolic hemiplegia
   - ○ Middle age: multiple sclerosis (MS)
   - ○ Old age: thrombotic hemiplegia

3. **Sex :**
   - ○ Females : Friedreich's ataxia, collagen diseases
   - ○ Males : Marie's ataxia , X linked recessive disorders

4. **Occupation:**
   - ○ Printers for lead neuropathy
   - ○ Drivers & porters : cervical spondylosis, paraplegia & cauda equina

5. **Marriage:** for sterility, impotence, still-births (as in syphilis)

6. **Menstrual history if female.**

7. **Residence & address:** pellagra in rural areas (deficient in maize)

8. **Habits of medical importance:**

Alcoholic (Peripheral neuritis, Karsakoff's syndrome, tremors), Smoking (atherosclerosis), Contraceptive pills contribute to DVT, headache, depression

9. **Handedness:**

- The centers in brain are bilaterally represented except speech centers which lie in the dominant hemisphere
- In right handed people, the dominant hemisphere is left
- In left handed people:
  - ○ Mostly 70 % dominant hemisphere is left
  - ○ Few (15%) dominant hemisphere is right
  - ○ Few (15%) bilaterally represented

## B. Complaint + duration: إي اللي جابك المستشفى ؟

❖ Common complaints :

- ▪ Heaviness on (one side e.g. right) upper & lower limbs
- ▪ Heaviness of both lower limbs
- ▪ Heaviness of both upper & lower limbs
- ▪ Shaking movement of both upper & lower limbs
- ▪ Loss of sensation in both hands & feet
- ▪ Staggering gait
- ▪ Inability to reach mouth with spoon properly during eating
- ▪ Inability to stand up from sitting position

## C. History of present illness = HPI المرض بدأ معاك إزاي , آخر مرة كنت كويس فيها إمتى ؟

| | | |
|---|---|---|
| ✌ 2 سيستم : حركة وإحساس | 1. Symptoms of Motor affection | 2. Symptoms of Sensory affection |
| ✌ 2 دماغ : أعصاب وضغط | 3. Symptoms of Cranial nerve affection | 4. Symptoms of increased Intracranial tension |
| ✌ 2 يخرجهم : كلام وحمام | 5. Symptoms of Speech affection | 6. Symptoms of Sphincteric & sexual troubles |
| ✌ 2 آخرين : تحاليل وأجهزة | 7. Investigations & treatment received | 8. Symptoms of other systems |

❖ **N.B.:**

| | |
|---|---|
| تتكتب في ال complaint بكلام العيان | ✍ |
| تتكتب في H/O of present illness عادي | الباقي |

**❖ Analysis of any complaint : OCD & associated symptoms**

❖ تحليل ال OCD & associated symptoms مهمين جدا في النيورو لأنهم بيساعدوني اني اعرف ال etiology فهنتكلم عنهم بالتفصيل شوية :

1. **Onset : من أول عرض حتى اكتمال الصورة النهائية للمرض**

| A. Acute onset : | B. Gradual onset: |
|---|---|
| ▪ من ثواني لأيام (14 يوم) | ▪ أكثر من 14 يوم (أسابيع - شهور – سنين) |
| a) **Dramatic onset:** ثواني<br>- trauma & embolism<br>b) **Apoplectic onset:** دقائق hemorrhage (apoplexy)<br>c) **Sudden onset :** ساعات : thrombotic<br>d) **Rapid onset :** أيام : inflammation | ▪ Tumors<br>▪ Space occupying lesion e.g. tuberculoma<br>▪ Degeneration |

- ترتيب أسباب ال hemiplegia طبقا لل onset ← EAT IT :

| | | | | |
|---|---|---|---|---|
| ▪ E: Embolism | ▪ A: Apoplexy | ▪ T:Thrombosis | ▪ I: Inflammation | ▪ T: Tumor |

2. **Course : من إكتمال الصورة النهائية حتى الآن**

| | | |
|---|---|---|
| ▪ **Progressive:** more severe symptoms or new symptoms | ▪ **Regressive** | ▪ **Stationary** |
| ▪ **Remittent:** in between attack the patient is ill e.g. DS | ▪ **Intermittent:** in between attack the patient is free e.g. Transient ischemic attack (TIA) | |

3. **Associated symptoms: Relation to:**

| | | |
|---|---|---|
| ▪ **Inflammation:** Fever | ▪ **Traumatic:** Trauma | ▪ **Hemorrhage:** Vomiting ,convulsions, coma |

✍ **If negative: not associated with either fever, trauma, vomiting, coma, or convulsion**

✌ **N.B.: diagnosis of disseminated sclerosis (DS) is by 2 things:**

1. **Remittent course**
2. **Multi-focal (white matter only in CNS)**

## 1. Symptoms of motor affection (weakness, involuntary movements, incoordination)

### 1) Weakness شلل – تقل – ضعف

✍ Heaviness or weakness

- Analysis :OCD : for etiology (see before), Character & distribution for the lesion

**Character:**

- **Degree :** paresis (weakness) or complete paralysis
  - شلل كلي ولا ضعف بس ؟
- **Tone :**
  - ○ Hypertonia عضلاتك ماسكة – مخشبة – ناشفة – شدة
    - ✍ Stiff
  - ○ Hypotonia ولا سايبة – مرخية
    - ✍ Flaccid or flail
- **Atrophy:** عضلاتك خست ولا زي ما هي قبل العيا ؟
  - ✍ Muscles are wasted
  - لو قال خست: بعد قد اي من العيا ؟ خست جامد ولا قليل ؟
- **Fasciculations** عضلاتك بترف ولا لأ ؟
  - ✍ Muscle Twitches
- **Trophic changes:**
  - شعرك بيقع ولا لأ ؟ ضوافرك بتقصف ولا لأ ؟
  - ✍ Falling of hair & Brittling of nails
- If negative, don't mention it.

**Distribution:** all questions are asked indirectly but the answer is written directly :

- **UL or LL or both**
  - الضعف في ايديك ولا رجلك ولا ايدك ورجلك ؟
  - لو قال إيدي ورجلي : بدأ في مين الأول ؟ دلوقتي مين أضعف ؟
- **Unilateral or bilateral**
  - يمينك ولا شمالك؟ ولا يمينك وشمالك؟
  - لو قال يميني وشمالي : بدأ في مين الأول ؟ دلوقتي مين أضعف ؟
- **Distal or proximal:**
  - في ال UL : أسهلك تعصر ليمونة ولا تسرح شعرك؟
  - في ال LL : أسهلك تلبس شبشب ولا تطلع السلم ؟

| | Distal | Proximal |
|---|---|---|
| UL | تعصر لمونة – بتعرف تكتب- تشتغل بالإبرة- تسبح | تسرح شعرك – يسوق- يشيل حاجة- يليف نفسه |
| LL | تلبس الشبشب- تنزل السلم | تطلع السلم |

- **Extensors or flexors :**
  - في ال UL : أسهلك تقفل الدرج ولا تفتحه؟
  - في ال LL : أسهلك تلبس البنطلون ولا تفرد رجلك فيه ؟

| | Extensors | Flexor |
|---|---|---|
| UL | تقفل الدرج | تفتح الدرج |
| LL | يفرد رجليه | تلبس البنطلون |

- **Abductors or Adductors :**
  - في ال UL : أسهلك تلبس القميص ولا تشيل حاجة تحت باطك؟
  - في ال LL : تشيل رجل من على رجل ولا تحط رجل على رجل ؟

| | Abductors | Adductors |
|---|---|---|
| UL | تلبس قميص | تشيل حاجه تحت باطك |
| LL | تشيل رجل من على رجل | تحط رجل على رجل |

### 2) Involuntary movements إيدي بترعش

✍ Shaking movement

**Character :**

| | |
|---|---|
| **Static** مع الثبات<br>In parkinsonism, chorea | **Or kinetic** مع الحركة<br>In cerebellar lesion |
| **Regular, Rhythmic** منتظمة<br>In parkinsonism | **Or irregular dysrhythmic** ملخبطة<br>In chorea |
| **Hypertonia** مخشبة<br>In parkinsonism | **Hypotonia** سايبة<br>In chorea |
| **What increases?** E.g. stress<br>**What decreases?** E.g. sleep | |

**Distribution:** all questions are asked indirectly but the answer is written directly :

- **UL or LL or both**
  - ○ إيدك ولا رجلك ولا إيدك ورجلك ؟
- **Unilateral or bilateral**
  - ○ يمينك ولا شمالك ولا يمينك وشمالك؟
- **Distal or proximal:**
  - ○ الرعشة أكتر ناحية كفك ولا كتفك ؟ , مشط رجلك ولا فخدك ؟
- **Involuntary movement in head & neck**
  - ○ في رأسك ورقبتك ولا لأ ؟
- **In other parts of the body**
  - ○ أي حتة تاني في الجسم ؟

### 3) Incoordination = ataxia

- ASKED ONLY IF THERE IS NO WEAKNESS :

**1. Cerebellar ataxia (Long case):**

A. **LL:** early: يمشي يطوح

✍ Staggering gait

B. **UL:** late

- ○ لما آجي أكل أو أشرب الملعقة ترعش كل لما تقرب

✍ Inability to reach the mouth with spoon properly during eating

**2. Sensory ataxia (part from P.N. case):**

A. **LL:** لما أجي أغسل وشي اقع

✍ Unsteadiness during eye closure

B. **UL:**

- ○ في السيدات : لا يمكن ربط السوستة الخلفية للفستان
- ○ في الرجال : لا يمكن ربط الكرافتة بدون مرآة

## 2. Symptoms of sensory affection (superficial, deep & cortical sensation)

### 1) Superficial sensation:

❖ Analysis: OCD: for etiology (see before), Character & distribution for the lesion.

**Character**

A. Irritation (early stage) في وجع أو شكشكة أو تنميل؟

1. **Pain وجع (for analysis see cardiology):**

✍ Pain

i. **Diabetic Peripheral neuropathy:**

- ○ Burning , nocturnal pain

ii. **Root (radicular pain):** الوجع محزمني , لافني

### 2) Deep sensation :

- ○ وأنت ماشي بتحس انك ماشي على حاجة صلبة ولا على قطن ؟

➢ Negative : صلبة

✍ No symptoms suggestive of deep sensory affection.

➢ Positive قطن : for sensory ataxia (Positive Rombergism) :

✍ The patient feels as if he walks on cotton

- ○ **Site:** along it's dermatome
- ○ **Character :** stitching
- ○ **Increased by:** coughing, sneezing, straining
- ○ **Decreased by:** rest & support
- ○ **Causes :**
- ▪ Paraplegia :
  - ✍ girdle pain
- → Value in leveling & etiology (extramedullary)
- ▪ Cauda equine (lumbo-sacral root)
- ▪ Cervical spondylosis

2. **Paresthesia عندك شكشكة أو تنميل ; abnormal sensation : tingling & numbness**

B. **Destructive lesion (late stage) : الاحساس قل ولا طبيعي؟**

1. **Hypoesthesia قل الاحساس**
2. **Anesthesia انعدم نهائيا**

➩ **Distribution:** UL or LL or both, unilateral or bilateral, proximal or distal

### 3) Cotical sensation

- **ASKED ONLY IF BOTH SUPERFICIAL AND DEEP SENSATION ARE INTACT :**

○ لما تحط حاجة في جيبك تعرف اللي فيه ولا لازم تطلعه وتبص عليه ؟

➢ If negative: بيعرف الحاجة

✍ No symptoms suggestive of cortical sensory affection

➢ If positive : لازم يطلع الحاجة ويبص عليها

✍ Patient cannot recognize things in his pocket unless he sees it.

## 3. Symptoms of Cranial nerve affection

**➩ CN 1:**

- ▪ حاسه الشم عندك قلت ولا طبيعي ؟
- ▪ **Anosmia , Parosmia**

**➩ CN 2:**

a) **Acuity of vision:**

b) **Colored vision:**

- النظر ضعف ولا طبيعي؟ أي عين ؟
- بتعرف تميز الألوان من بعضها ولا لأ ؟
- وأنت ماشي بتخبط في الناس والعواميد ولا لأ ؟

**➩ CN 3, 4, 6: ocular nerves:**

a) **Ptosis**

- جفنك سقط ولا طبيعي ؟ لو آه انهي ناحية ؟

b) **Squint**

- عينك احولت ؟ لو آه انهي ناحية ؟ ولبره ولا جوه؟

c) **Diplopia**

- بتشوف الحاجة اتنين ولا طبيعي؟

**➩ CN 5: trigeminal**

a) **Motor : difficult mastication**

- في صعوبة في المضغ ولا طبيعي ؟

b) **Sensory : face sensation**

- ▪ **Irritation :**
  - في وجع او شككة او تنميل في وشك ولا طبيعي ؟
- ▪ **Destruction :**
  - الاحساس في وشك قل ولا طبيعي ؟

**➩ CN 7 , facial :**

a) **Upper motor :**

- ▪ **Orbicularis oculi :**
  - لما بتغسل وشك وتزر على عينك , في صابون بيدخل ؟ لو آه أنهي ناحية؟
  - عينك بتدمع زيادة ولا طبيعي ؟ لو آه انهي ناحية؟

b) **Lower motor:**

- ▪ **Buccinator :**
  - لما بتاكل , الأكل بيتجمع في بقك ولا طبيعي , لو آه أي ناحية؟
- ▪ **Orbicularis oris**
  - ريقك بينزل من بقك ولا طبيعي , لو آه اي ناحيه ؟
- ▪ **Retractor angulator**
  - بقك اتعوج على ناحية ولا طبيعي ؟لو آه أي ناحية؟

c) **Sensory :**

- ▪ Taste in anterior 2/3 of the tongue
  - بتعرف تدوق الأكل بطرف لسانك ولا لأ؟

**➩ CN 8: Vestibulocochlear**

a) **Cochlear part :**

- ▪ **Irritating :** tinnitus
  - فيه وش في الودان ولا طبيعي
- ▪ **Destruction:** diminished hearing, deafness
  - السمع تقل ولا طبيعي ؟

b) **Vestibular part:**

- بتحس ان الأرض بتلف بيك ولا لأ ؟ (متقولش انته دايخ ولا لأ )

**➩ CN 9, 10, { 11; cranial accessory}:**

a) **Palate :**

- ▪ Nasal tone صوتك اخنف ولا لأ
- ▪ Nasal regurge
  - لما بتشرب ميه , بترد من مناخيرك ولا لأ

b) **Pharynx**

- ▪ Dysphagia
  - في صعوبة في البلع ولا لأ
- ▪ Chocking attacks
  - بتشرق كتير ولا لأ

c) **Larynx**

- ▪ Dysphonia (hoarseness of voice)
  - صوتك اتنبح ولا لأ
- ▪ Dysarthria
  - في صعوبة في النطق ولا لأ

**➩ CN 11: spinal accessory**

- ▪ **Sternomastoid** بتعرف تحود رقبتك شمال ويمين ولا لأ
- ▪ **Trapezius** كتفك سقط ولا طبيعي ؟ اي ناحية ؟

**➩ CN 12: hypoglossal**

- ▪ لسانك اتعوج على ناحية ولا لأ , اي ناحية ؟
- ▪ في صعوبة في النطق ولا لأ؟

## 4. Symptoms of increased intracranial tension هل عندك صداع مستمر لا يستجيب للمسكنات ؟ هل حدث لك قيئ ؟ هل عينك زغللت ؟

| • Persistent headache | • Projectile vomiting | • Blurring of vision | • Convulsions & coma |
|---|---|---|---|
| ➢ Severe bursting<br>➢ At the early morning (not relived by sleep)<br>➢ Partially relived by the vomiting | ➢ At the peak of headache<br>➢ Not related to meals, not preceded by nausea | | |

## 5. Symptoms of Speech affection:في مشاكل في الكلام ولا طبيعي ؟

## 6. Symptoms of Sphincteric troubles

- • **Defecation**
- • **Micturition :**

➢ **Incontinence** بتبول على نفسي – مش قادر أتحكم في البول :

✍ Retention with overflow or automatic bladder or

## Symptoms of Sexual troubles:

- ➢ Impotence in DM , multiple sclerosis
- ➢ Degree of impotence :
  - ▪ Partial : can give birth
  - ▪ Complete : can't give birth

| | |
|---|---|
| nocturnal enuresis<br>➢ **Hesitancy:** البول لازم اتحايل عليه شويه – البول بيتأخر عندي<br>✍ Difficulty in initiation of micturition<br>➢ **Precipitancy** وأنا رايح الحمام البول يسيب مني – البول بيسبقني<br>✍ Difficulty in holding urine when he feels the desire | ↳ Analysis :<br>▪ عندك مشاكل في الانتصاب أثناء المعاشرة الزوجية ولا لأ ؟<br>▪ لو في ← مرات ومرات ولا على طول ؟<br>▪ لو آه ← الانتصاب الصباحي ضعف ولا طبيعي ؟<br>▪ لو آه ← بتاخد أدوية ولا لأ ؟ |
| **7. Investigation & treatment received** | **8. Symptoms of other systems** |
| • عملت فحوصات اي ؟ واخدت علاج اي؟<br>• CT brain, MRI, carotid duplex<br>• ECG, echocardiography<br>• Blood sugar, lipid profile<br>• Physiotherapy, vitamins, antiplatelet drugs, anticoagulant drugs. | ➢ هل عندك مشاكل تانية في جسمك ؟<br>وتاخد كل سيستم وتسأل العيان على الأعراض الكبيرة اللي فيه بسرعة أوي |

## D. Past history as usual but focus on:

↳ **Diseases**

1. Rheumatic fever : embolic hemiplegia, SA hemorrhage (in SBE), chorea
2. Chronic suppuration : bronchiectasis & otitis media in brain abscess, facial palsy
3. Diabetes: Peripheral neuritis
4. Hypertension: in stroke
5. TB: TB toxemia in paraplegia (Pott's), cerebellar ataxia (tuberculoma)
6. Syphilis: chancre, recurrent abortions in sensory ataxia (Tabes dorsalis)

↳ **Operations & drugs**

| | | | | |
|---|---|---|---|---|
| ○ Convulsion : ambilhar | ○ Peripheral neuritis : INH , streptomycin | ○ Parkinsonism : major tranquilizer | ○ Myopathy : vincristine, steroids | ○ Cerebellar ataxia : hydantoin |
| ○ 8th CN: streptomycin | | ○ 2nd CN: ethambutol | | |

↳ Similar attacks : in DS & T.I.As

↳ Trauma: disc prolapse, paraplegia, cauda equina lesion

↳ Fever: meningitis, encephalitis, transverse myelitis

## E. Family history as usual & asked for congenital & heridofamilial diseases

# DISCUSSION ON HISTORY

↳ **What are the causes of micturition disturbance in neurological case?**

→ **Causes of neurogenic bladder (Lesion must be bilateral):**

- ○ **UMNL :** Paraplegia (nerve hemiplegia)
- ○ **LMNL:**

| Segment : Conus lesion | Root: Cauda equina lesion | PN:Peripheral neuropathy, DM |
|---|---|---|

↳ **How can TB cause paraplegia ?**

| ↳ Mechanical : | ↳ Inflammatory : | ↳ Vascular : |
|---|---|---|
| ▪ Bone : Pott's disease<br>▪ Soft tissue : psoas abscess | ▪ Transverse myelitis<br>▪ TB pachymeningitis | ▪ Endarteritis obliterans of the anterior spinal artery |

❖ **What is the effect of Bilharziasis in neurological patient ?**

- **Bilharsioma :** rare
  - ○ Space occupying lesion, affecting spinal cord causing paraplegia
- **Ambilhar (niridazole):** Antibilharzial drug causing convulsions

❖ **What is the difference between congenital disease & heredofamilial disease ?**

| ↳ Congenital disease | ↳ Heredofamilial disease |
|---|---|
| ▪ The patient is born with anatomical or physiological defect even if there are no symptoms e.g. Congenital heart disease | ▪ The patient is born anatomically & physiologically normal<br>▪ The symptoms appear at certain age e.g. Cerebellar ataxia |
| ▪ Not necessarily positive family history | ▪ Positive family history |

### ❖ What is the incidence of impotence?

| Incidence | Psychic | Organic |
|---|---|---|
| In the past | 90 % | 10 % |
| In the present time | 50 % | 50 % |

### ❖ What are the causes of impotence ?

1. **Psychic : anxiety neurosis**
2. **Organic :**
   - **A. Nervous**

→ Erection is a reflex having :

- Afferent : posterior root
- Center : S2,3,4
- Efferent: anterior root

↳ So any lesion in :

- Segment : Conus lesion
- Root : Cauda equina lesion
- PN:Peripheral neuropathy, DM

**B. Vascular** " ischemia of penis": Le Rich syndrome , Sympathectomy of L1

**C. Iatrogenic** e.g. H2 blocker for treatment of Peptic ulcer & antihypertensive drugs except ACEI

### ❖ How to differentiate between causes of impotence?

Ask about morning erection

- Absent : Organic
  - ↓ Ask about history of drug intake
    - Absent : Vascular Or Nervous
      - ↓ Testicular sensation test "pressure on testis": it depends on that nerve supply of penis is the same of testis:
        - Intact sensation in vascular causes
        - Impaired sensation in nervous causes
    - Present : Iatrogenic Impotence
- Present → Psychic Impotence

### ❖ What is the degree of impotence?

- **Complete :** no erection of any degree at any time, can't give birth
- **Partial:** erection or semierection occur, can give birth

### ❖ What are the causes of impotence in diabetic patient ?

- ○ Diabetic **peripheral neuropathy "nervous"**
- ○ Diabetic **ischemia "vascular"**
- ○ Usually diabetes is associated with atherosclerosis → hypertension , so the patient receives **antihypertensive drugs "iatrogenic"**
- ○ Most of patients know the hazards of D.M. including impotence → **anxiety & depression "psychic"**

### ❖ What are investigations and treatment of impotence?

↳ **Investigations :** Doppler US

↳ **Treatment :**

- Treatment of the cause e.g. control of DM & hypertension
- Medical treatment e.g. vasodilators e.g. papavirin
- Surgery e.g. penile prosthesis " fixed or inflatable"

# General Examination Of Neurological Case

**❖ Examination as general examination but stress on the following:**

## I. Vital signs

| ❖ Temperature | ❖ Pulse | ❖ Blood pressure | ❖ Respiratory rate |
|---|---|---|---|
| See below | ❖ Irregular "AF" in embolism | ▪ Hypertension in stroke (thrombotic or hemorrhagic) | See below |

**☠ What are the Causes of fever in a neurological case?**

| 1. Brain | 2. Brain stem | 3. Spinal cord | 4. Peripheral nerve | 5. Muscle |
|---|---|---|---|---|
| • Brain abscess<br>• Meningitis<br>• Encephalitis<br>• Encephalomyelitis | ▪ Pontine hemorrhage | ▪ Poliomyelitis<br>▪ Transverse myelitis | ▪ Landry-Guillan – Barre syndrome | ▪ Myositis |

## II. General overview

| A. Appearance | B. Built | C. Consciousness | C. Colors | D. Decubitus | E. Expression |
|---|---|---|---|---|---|
| ▪ Asymmetrical face in facial palsy | ▪ Under built: depression, anorexia nervosa<br>▪ Over built: myxedema; pseudo-hypertrophy | ▪ DCL: in hypertensive encephalopathy | ▪ See below | ▪ Orthopnea in HF : dilated cardiomyopathy in Fredrich's ataxia or Duchenne's myopathy | ▪ Mask face in Parkinsonism<br>▪ Myasthenic face :in myasthenia |

**☠ What are the Causes of … in neurological case ?**

| ❖ Jaundice | ❖ Cyanosis | ❖ Pallor |
|---|---|---|
| 1. Sickle cell anemia → embolic hemiplegia<br>2. Thalassemia (chronic hemolysis) → hemosiderosis in caudate lobe → chorea | • Respiratory muscle paralysis leading to respiratory failure in myopathies | • Subacute combined degeneration due to vitamin B12 deficiency |

## III. Systemic overview :

| ❖ Head | ❖ Neck | ❖ Upper limb | ❖ LL |
|---|---|---|---|
| ▪ Bony bosses e.g. meningioma | ▪ Congested Neck veins :<br>○ In heart failure as in myopathy<br>▪ Carotid bruit : athermtous plaque in embolic or thrombotic stroke or TIA | • Skin : Angiomatous malformation may point to similar lesion in brain | • DVT : in prolonged recumbency of paralyzed patient<br>• Ischemic signs in thrombotic or embolic hemiplegia |

## IV. Other systems except that of local exam :

| ❖ Cardiac examination | ❖ Chest examination | ❖ Abdominal exam. |
|---|---|---|
| ↳ **As a cause :**<br>▪ Hemiplegia , may occur due to :<br>a) Embolism : source : MS & AF<br>b) Hemorrhage :<br>▪ Severe hypertension, Intracranial hemorrhage<br>c) Thrombosis : atherosclerosis of small sized arteries e.g. cerebral & coronary arteries<br>↳ **As a result :**<br>▪ Autonomic neuropathy of the heart leading to :<br>a) Postural hypotension, Painless infarction<br>b) Sudden death<br>↳ **As an association :**<br>▪ Duchenne Myopathy, Friedreich's Ataxia<br>▪ Rheumatic Chorea | ↳ **As a cause:**<br>○ TB; Pott's disease → paraplegia<br>↳ **As a result :**<br>• Respiratory muscle paralysis leading to :<br>a) Hypostatic pneumonia<br>b) Respiratory failure | ↳ **As a cause:**<br>▪ LCF → hepatic encephalopathy<br>↳ **As a result :**<br>• Autonomic neuropathy of the GIT leading to :<br>a) Gastroparesis diabeticorum<br>b) Diabetic enteropathy diarrhea<br>↳ **As association :**<br>▪ Wilson's syndrome (hepato-lenticular degeneration) |

# Local Examination Of Neurological Case

| | | |
|---|---|---|
| 1. Mentality | | 2. Speech |
| 3. Cranial nerves | | 4. Meningeal irritation |
| 5. Motor system | 6. Reflexes | 7. Sensory system |
| 8. Others : Cranium , neck, back, spine & Gait | | 9. Other systems |

## 1. Mentality

1. **State of consciousness** درجة الوعي
2. **Orientation to time, place, person** دلوقتي صبح ولا بليل ؟ عارف انته فين ؟ عارف أنا مين ؟
3. **Memory :**

| a) Immediate memory | b) Recent memory | c) Remote memory |
|---|---|---|
| ▪ نذكر له بعض الأرقام ثم نطلب منه أن يقولها بنفس الترتيب | ▪ فطرت اي النهاردة ؟ | ▪ نسأله عن تاريخ جوازه – آخر 3 رؤساء للبلد - .... |

4. **Affect (Mood):**

| Affect: is the outward expression of emotion | Mood : is the patient's inner feelings |
|---|---|

**Abnormality include :**

- Depression : stroke, parkinsonism
- Euphoria: disseminated sclerosis (D.S.)

5. **Mentality** (assessed by intelligent quotient test; IQ معدل الذكاء )

❖ لو الدكتور والمريض فهموا بعض ← average mentality

6. **Behavior :** السلوك

❖ طالما العيان اداك history وسمح لك بال examination يبقى ← Cooperative

❖ Comment on mentality: The patient is fully conscious, cooperative, well oriented to time, place & person, average memory, affect (mood), & mentality.

? What is the Glasgow coma scale? See discussion later
? What are the grades of disturbed consciousness?
? What are the types & causes of amnesia?
? What are the disorders in the mood & affect?
? What is hallucination , illusion, delusions, delirium, dementia ?

إجابات الأسئلة موجودة في منهج ال Psychiatry
بالتفصيل جداً مقررة عليك... ذاكرهم من مصدر واحد
علشان تحافظ على ال Photo-graphic memory

## 2. Speech

- يتم ملاحظته أثناء أخذ ال History
- اطلب من المريض يقرأ الفاتحة أو يعد من 1 إلى 10
- ممكن يقرأ الفاتحة كويس أوي رغم ان عنده speech defect لأنه متعود عليها , علشان كده الصح انك تخليه يقرأ حاجة مش متعود عليها (بلاد بره)

❖ **The main speech disturbance include:**

A. **Aphasia:** inability to formulate speech (lesion in speech center) in absence of lesion of sense organ or mental defect & occurs in the cortical lesions affecting the dominant hemisphere.

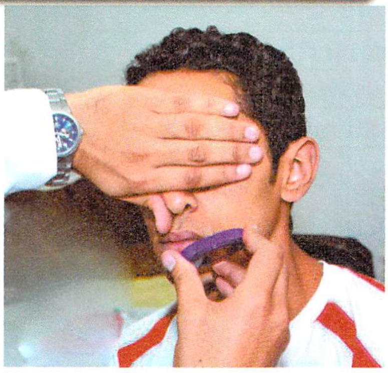
B. **Dysarthria** : inability to articulate speech ( lesion in neuromuscular junction) with normal formulation (normal speech center)

**Types of dysarthria :**

1. **Slurred speech** ياكل الكلام بسرعة : due to
- Bilateral pyramidal tract lesion = pseudo bulbar palsy
- Lesions involving the LMN of the cranial nerve concerned with speech (5, 7, 10, 12)
2. **Staccato speech** الكلام متقطع : bilateral cerebellar lesion (hereditary ataxia, D.S.)
3. **Monotonous speech** الكلام على وتيرة واحدة : extrapyramidal tract lesion (parkinsonism)
4. **Scanning speech** = slurred + Staccato in cerebellar lesions

## 3. Cranial nerve examination

## CN 1 : olfactory nerve



1. شروط ما قبل الفحص:

| أ) المادة لها شروط : | ب) العيان له شروط : |
|---|---|
| ▪ تكون معروفة للعيان زي البن أو النعناع | ▪ قافل عينه ومش شايف المادة |
| ▪ متبقاش irritant علشان تتجنب ال 5th CN irritation | ▪ فحص كل nostril على حده |

2. طريقة الفحص:

- في نفس الوقت بنفس اليد : الدكتور يغلق العينين واقفل واحدة من ال nostrils
- واليد التانية اشممه المادة
- ثم كرر الخطوات السابقة على ال nostril الأخرى

❖ **Abnormality :**

- **Unilateral anosmia :** **Neurological**; **basal** meningitis, **F**racture skull **base**, **F**oster Kennedy syndrome
- **Bilateral anosmia :** local **ENT** causes & hysterical

## CN 2 : optic nerve

1. **Acuity of Vision:**

A. **Classically by:** Snellen's chart more than 6 meters distance.

B. **Bedside test: for less than 6 meters distance:**

❖ هنفحص عينيه الاتنين , كل عين مرة لوحدها , واطلب منه يفتح عين ويغمض التانيه

❖ Counting finger from 6m to 30 cm, **if the patient cannot, do the next step;**

❖ Hand movement at 30 cm distance, **if the patient cannot, do the next step;**

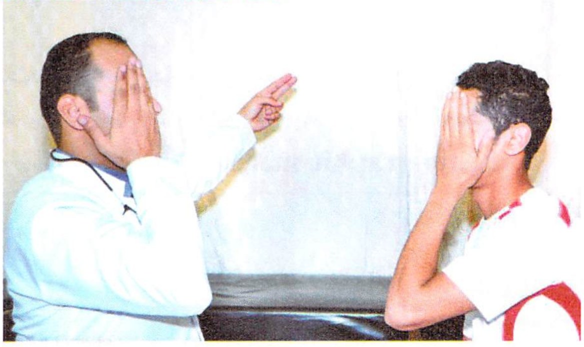
❖ Perception of light:

- No perception of light means blindness.

2. **Field of vision :**

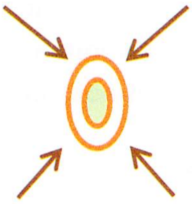
A. **Classically by:** Central vision (Bjerrum's screen) & peripheral vision (Perimeter)

B. **Bedside test: Confrontation test:**



❖ طريقة الفحص :

1. الدكتور والعيان لازم يكونوا على نفس المستوى
2. المسافة ما بينهم تتروح ما بين 60 – 100 cm
3. لو الدكتور أو العيان من ذوي النظارات لازم تتشال , ليه ؟؟؟ ← rim of glasses may create artificial visual field defect
4. المريض يغمض عين والدكتور يغمض العين المقابلة لها
5. أهم جملة لازم تقولها وعليها الدرجة كاملة : **ثبت عينك في عيني ومتحركهاش ولما تشوف صباعي قولي**
6. الدكتور يحرك صوابعه من بره لجوه بحركة سامبوكسة في أربع اتجاهات مع استخدام اليد المناسبة في فحص ال field of the vision
   - ○ على سبيل المثال عند فحص العين اليمنى للمريض – المريض يقفل عينه الشمال و الدكتور يقفل عينه اليمين :
   - ○ حرك صوابع اليد اليسرى لفحص ال lateral field
   - ○ حرك صوابع اليد اليمنى لفحص ال medial field
   - ○ والعكس في العين الشمال للمريض
7. لما يقولك شايف , قوله صباعي بيتحرك ولا لأ / ثابت ولا لأ ؟
8. كرر الخطوات السابقة في العين الأخرى



❖ Results :

- ○ **Normal field:** if the patient notices your finger at periphery the same time as you do
- ○ **Field defect:** according to the site of the lesion in optic nerve pathway e.g. optic chiasma lesion → bitemporal hemianopia

3. **Ophthalmoscope : for papilledema, optic atrophy**
4. **Colour Vision by Ishiahara's chart for color blindness.**

## Ocular cranial nerves: CN 3:oculomotor, CN 4: Trochlear, CN6: Abducent, :

❖ **Ocular muscles:**

| A. Extra-ocular muscles | B. Intra-ocular muscles |
|---|---|
| A. **4 recti :** superior, inferior, medial, lateral recti<br>B. **2 oblique:** inferior oblique, superior oblique<br>C. **Lid muscles :**<br>▪ levator palpeprae superioris: elevates the upper eye lid<br>- Muller's muscle (smooth muscle adjoining LPS): maintains the upper eye lid elevated | A. **Pupil:**<br>▪ Dilator pupillae<br>▪ Constrictor pupillae<br>B. **Lens:**<br>▪ Ciliary muscle : responsible for light & accommodation reflex |

❖ Nerve supply

| | |
|---|---|
| **All Extra ocular muscles are supplied by the oculomotor nerve except :**<br>○ Muller's muscle by sympathetic nerves<br>○ Lateral rectus by abducent nerve (LR6)<br>○ Superior oblique by trochlear nerve (SO4) | ▪ **Dilator pupillae :** by sympathetic nerve supply<br>▪ **Constrictor pupillae & Ciliary muscle:** parasympathetic supply through oculomotor nerve |

❖ Lesion:

| A. External ophthalmoplegia | B. Internal ophthalmoplegia |
|---|---|
| ❖ No diplopia, Diplopia occurs only on passive elevation of eye lid<br>❖ Complete ptosis (paralysis of LPS)<br>❖ Divergent paralytic squint, the eye looks out & down due to unopposed action of SO & LR | ▪ Ipsilateral Dilated fixed pupil (Mydriasis)<br>▪ Loss of light & accommodation reflex |

→ So CN 3 lesion : 3 D + loss of 2 reflexes + complete ptosis

| CN 4 lesion | CN 6 lesion | Sympathetic lesion "Horner's syndrome" |
|---|---|---|
| ❖ Diplopia on looking downwards<br>وهو نازل السلم أو بيقرأ<br>❖ Limitation of eye movement on looking inwards & downwards | ❖ Diplopia on looking outwards<br>❖ Limitation during examination of eye movement in outward direction<br>❖ Convergent paralytic squint | ❖ Unilateral partial Ptosis due to lesion in Muller's muscle<br>❖ Miosis due to lesion in dilator pupillae<br>❖ Anhydrosis, Enophthlamos<br>❖ Lost spino-ciliary reflex<br>❖ Conjunctival congestion |

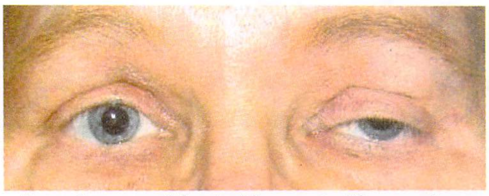
❖ **Examination of ocular nerves ; examination of:**

| A. Inspection | B. Power | C. Reflexes |
|---|---|---|

## A. Inspection

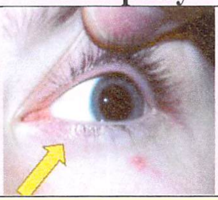
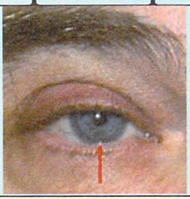
| 1. Ptosis | 2. Squint | 3. Size of pupil | 4. Nystagmus |
|---|---|---|---|

### 1. Ptosis :



- **Normally** : upper eye lid covers 1/6 of the cornea
- **Abnormally** Ptosis: upper eye lid covers > 1/6 of the cornea
- **Causes :**
  - $3^{rd}$ nerve palsy & sympathetic palsy
  - Myasthenia gravies (bilateral with normal pupil + other myasthenic manifestations + diurnal variation)
  - Myopathy, Motor neuron disease
  - Congenital, traumatic

❖ إزاي تفرق ما بين ال Ptosis of $3^{rd}$ nerve palsy & sympathetic palsy ؟

| 3rd N. palsy | Sympathetic palsy |
|---|---|
|  |  |
| I. ارفع الحاجب وبص على ال Pupil : | |
| ○ Dilated fixed (mydriasis) & Divergent squint | ○ Miosis, Enophthalmos of eye ball |
| II. اعمل Thumb test :<br>▪ اطلب من المريض أنه يقفل عينه<br>▪ دوس بال thumbs على ال superior orbital margins حتى تلغي عمل ال frontalis muscle<br>▪ اطلب من المريض انه يحاول يفتح عينه | |
| ○ لو مقدرش complete ptosis | ○ لو قدر ولو قليلاً Partial ptosis |

## 2. Nystagmus :

❖ **Definition :** involuntary rhythmic oscillatory movement of the eye ball

→ N.B.: Nystagmus is a sign not a symptom

❖ **Causes of nystagmus:**

a) Physiological

b) Pathological:

- Central causes: brain stem, cerebellum
- Peripheral causes : retinal, vestibular

❖ **طريقة الفحص :**

1. حط صباعك بزاوية 30 درجة على العين لبره على مسافة 30 سم
   - ملاحظة: لو حطيت صباعك بزاوية 180 درجة على العين ,
   - عضلات العين تتعب أوي ويبان nystagmus في أي شخص عادي , وده اللي اسمه Nystagmoid feature
2. خليه يبص عليه لمدة حوالي 30 ثانية
3. يتم الفحص مرة للعين اليمين ومرة للعين الشمال
4. يتم الفحص في كل عين : مرة لفوق ويثبت عينه ومرة لتحت ويثبت عينه
5. وبعد كده لو فيه nystagmus حدد ال :

❖ **Comment points :**

a) **Type :** Spontaneous or with fixation

b) **Plane :** horizontal or vertical or rotatory

c) **Phase :**

- Monophasic (pendular راحة وجاية بنفس السرعة ) or
- Biphasic (jerky واحد بطيئ والتاني سريع كأنه بينط )

d) **Direction of nystagmus :**

- If Biphasic :Direction of nystagmus is that of rapid phase

e) **Laterality :**

- Unilateral (dissociated) or bilateral (associated)

❖ **Characters of cerebellar nystagmus :**

a) **Type :** with fixation

b) **Plane :** horizontal

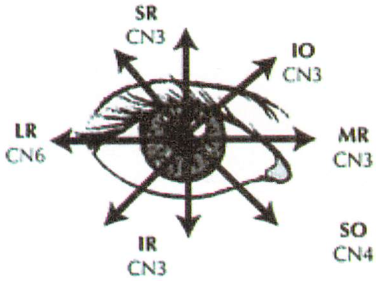
c) **Phase:** biphasic

d) **Direction :** towards the fixation point

e) **Laterality :** bilateral (associated)

## B. Power

### 1. Each eye separate :



❖ **طريقة الفحص :**

**قواعد الفحص :**

- تكلم العيان وتشاور له الحركات مع بعض
- العيان يثبت رقبته ويقفل عينه بإيده
- ثبت رأسه بإيدك
- اطلب منه انه يحرك عينه مش راسه

**ثم :**

| | |
|---|---|
| 1) إبدأ من المنتصف ثم عينك لبره ← lateral rectus | → CN 6 |
| 2) وهي بره فوق SR ثم تحت IR<br>3) إرجع ابدأ من المنتصف ثم عينك لجوه ← medial rectus<br>4) وهي جوه لفوق IO | → CN 3 |
| 5) ثم تحت SO | → CN 4 |

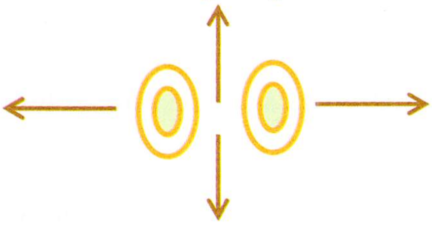
**إزاي تعرف ان فيه weakness ولا مافيش ؟**

- عن طريق ال range of movements
- If weakness → rim of sclera

### 2. Both eye together (conjugate eye movement):

☠ لا تختبر الا اذا كانت كل عين حركتها سليمة لوحدها والإ أصبح عبثاً

- تطبيق القواعد, ثم فحص حركة العينين معا في الأربع إتجاهات :



1) عينيك الاتنين فوق
2) عينيك الاتنين تحت
3) عينيك الاتنين يمين
4) عينيك الاتنين شمال

هل ممكن كل عين تبقى حركتها سليمة ورغم ذلك ال conjugate eye movements بايظة ؟؟؟

آه ممكن ← امتى ؟

Lesion in :

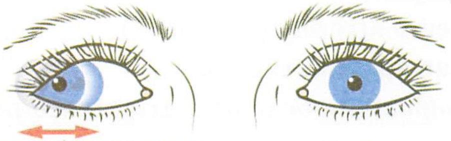
a) Cortical conjugate center (area 8) → lost conjugate movement to hemiplegic side

b) Pontine conjugate center → lost conjugate movement to opposite side of hemiplegia

c) Medial longitudinal bundle (M.L.B.) → Ophthalmoplegia internuclearis : Pathognomonic to Disseminated sclerosis :

→ on looking to one side there is :

- Nystagmus of abducting eye
- Weakness or paralysis in adducting eye



ما نوع ال conjugate eye movements التي اختبرتها ؟

Voluntary conjugate eye movements

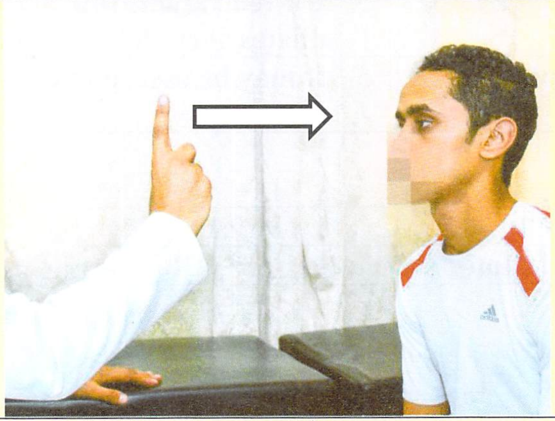
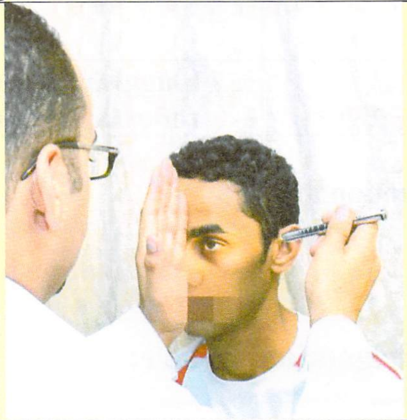
هل فيه أنواع تانيه ؟

Reflex conjugate eye movements ← آه فيه

إمتى ؟

Oculo-cephalic reflex → negative reflex in comatose patient's means that brainstem is not intact

## C. Reflexes

| ❖ Reflex | A. Accommodation (near) reflex: | B. Pupillary Light reflex: |
|---|---|---|
| → Normal pupil is RRR (round, regular, reactive to light & accommodation) | | |
| |  |  |
| ❖ Technique | ❖ هات صباعك من بعيد وقوله تابع صباعي لحد حوالي 20 سم<br>❖ أو (عند الطلب) : قول للعيان يبص على مكان بعيد ويركز في نقطة فيه وفجأة حط صباعك قدامه وقوله بص على صباعي | 1. افصل ما بين العينين بأن تضع يدك حاجز<br>2. حط الضوء على العين من الجنب (ويفضل والنور مقفول)<br>3. راقب سرعة ضيق الحدقة ( Direct )<br>4. شيل الضوء<br>5. بص على العين التانية الأول ثم ضع الضوء مرة أخرى<br>6. راقب سرعة ضيق الحدقة في العين التانية (Indirect ) |
| ❖ Stimulus : | ▪ Near object | ▪ Light to the eye |
| ❖ Pathway | ▪ Optic nerve (afferent) → optic chiasma → Optic tract → Lateral Geniculate Body → visual area (17) in occipital lobe (center) → area 8 →E.W. nucleus both sides in midbrain→ both 3rd nerve (efferent) → 3 muscles (constrictor pupillae, medial recti & ciliary muscles) | ▪ Optic nerve (afferent) → optic chiasma → Optic tract → pretectal nucleus in the midbrain (center) decussating around aqueduct of sylvius → Edinger Westphal nucleus both sides → both 3rd nerve (efferent) → ciliary ganglia → short ciliary nerves → constrictor pupillae muscles |
| ❖ Response : | ▪ Bilateral Constriction of both pupil ( both miosis) by constrictor pupillae muscles.<br>▪ Bilateral convergence (both MR)<br>▪ Bilateral contraction of ciliary muscles → convex lens → focusing | ▪ Ipsilateral (direct) & contralateral (Consensual) constriction of pupils |
| ❖ Lesion: | ▪ In optic nerve atrophy : absent reflex<br>▪ In 3rd Nerve palsy : ipsilateral loss of response | ▪ In optic nerve atrophy : absent direct & consensual LR<br>In 3rd Nerve palsy : ipsilateral absent direct & present consensual LR |

### C. Ciliospinal reflex :

- Technique: pinching of skin on one side of neck
- Normal Response : dilatation of ipsilateral pupil.
- Abnormally absent in: sympathetic lesion (Horner's syndrome)

### ❖ What are the causes of miosis & mydriasis?

| ❖ Causes of mydriasis | ❖ Causes of miosis |
|---|---|
| • Parasympathetic (III CN) lesion<br>• Adie's pupil<br>• Optic nerve atrophy (blindness)<br>• Drugs: atropine & cocaine<br>• Physiological : poor light & frightened person | • Sympathetic lesion (Horner syndrome)<br>• Argll-Robertson pupil<br>• Potine hemorrhage<br>• Drugs : morphine, pilocarpine<br>• Physiological : bright light & sleep |

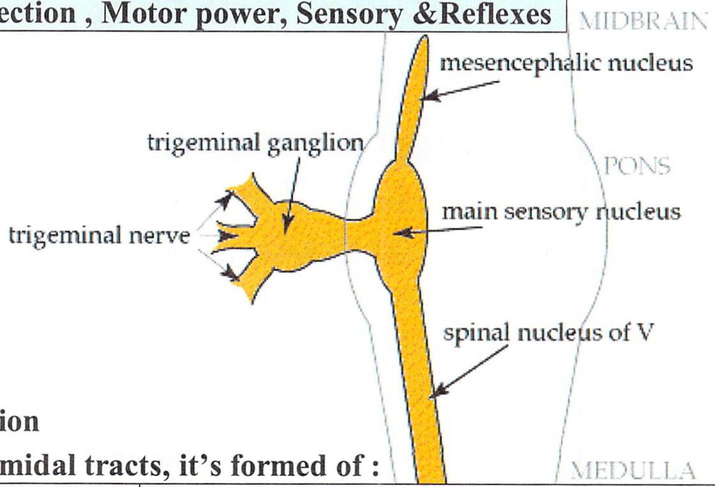
### ❖ What is the difference between Argyll-Robertson pupil & Holme's Adies pupil?

| | Argyll-Robertson pupil | Holme's Adies myotonic pupil |
|---|---|---|
| ▪ Causes | ○ Lesion in prei-aqueductal region of the midbrain :<br>▪ Neurosyphilis, Syringobulbia<br>▪ DS, DM , Chronic alcohlism<br>▪ Encephalitis<br> | ○ It is a benign heredofamilial , usually unilateral, of acute onset, occurring in females<br> |
| ▪ Pupil | ○ Miotic, irregular, eccentric pupil | ○ Dilated pupil |
| ▪ Light reflex | ○ Loss of light reflex | ○ Loss of light reflex |
| ▪ Accommodation reflex | ○ preserved accommodation | ○ Very slow reaction to accommodation<br>○ On relaxation from accommodation , pupil dilates very slowly (tonic pupil) |
| ▪ Others | ○ Sluggish response to cilio-spinal reflex & to mydriatics | ○ It may be associated with lost ankle reflex |

### ❖ Examination of CN :

| CN 5 | CN 7 | CN 9,10 |
|---|---|---|
| Examination by Inspection , Motor power, Sensory &Reflexes | | |

## CN5; Trigeminal nerve:



### ❖ Hint of anatomy :

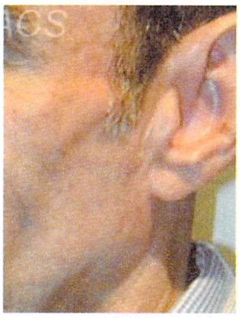
- It is mixed nerve "motor & sensory"
- Mainly sensory to face
- Supply motor fibers for muscles of mastication
- Its nucleus takes bilateral supply from pyramidal tracts, it's formed of :

| Nucleus | Site | Sensation |
|---|---|---|
| Mesenchepalic nucleus | Midbrain | Proprioceptive |
| Main sensory nucleus | Pons | Touch |
| Spinal nucleus | Medulla | Pain & temperature |

→ In the Spinal nucleus:

- The face is represented upside down i.e. Ophthalmic fibers end in lower part of the nucleus and mandibular fibers in the upper part of the nucleus
- The peripheral part of the face is represented in the inner part of the nucleus and the central part of the face is represented in the outer part of the nucleus

### 1. Inspection for hollowing:



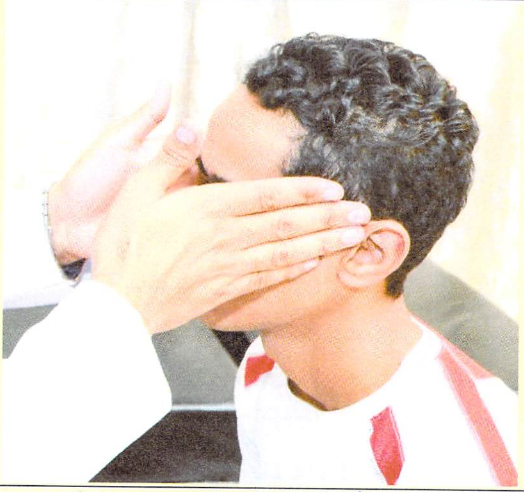
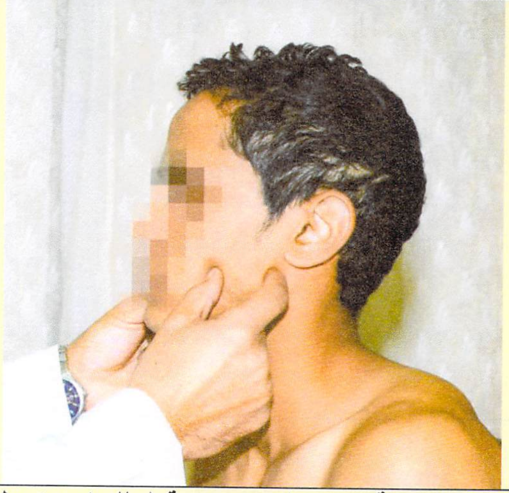
▪ شوف هل في تجويف :

⇦ فوق ال zygoma ← temporalis muscle

⇦ تحت ال zygoma ← masseter muscle

▪ شوف ال symmetry , هل الناحيتين زي بعض ولا لأ

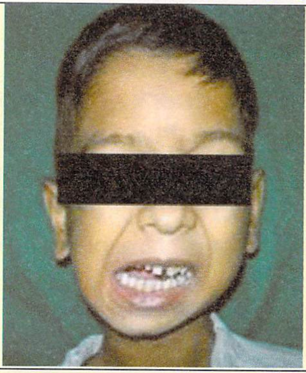
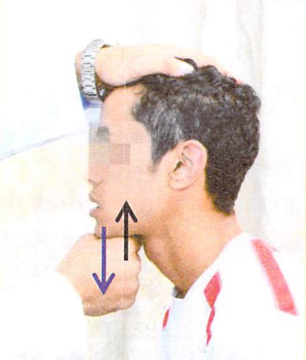
## 2. Motor Power:

| A. Temporalis muscle | B. Masseter muscle |
|---|---|
|  |  |
| ▪ حط إيدك على العضلة وقول للعيان جز على سنانك وسيب | ▪ إمسك العضلة وحس ال bulk وقول للعيان جز على سنانك وسيب |

**C. Pterygoid muscles:**

○ كل Pterygoid muscle تزق الفك للناحية المقابلة
○ العضلتين معاً تنزل الفك لتحت مباشرة

1. قوله افتح بقك وشوف حركة الفك :

| | |
|---|---|
|  [redacted] | <br>● اللون الأسود : الدكتور<br>● اللون الأزرق : المريض |
| ☜ لو حود على ناحية : تستفيد ان :<br>○ ان الفك بيشاور على الناحية الضعيفة (فكسان عيان)<br>○ Unilateral LMNL | ☜ لو نزل في النص يبقى حاجه من اتنين :<br>○ الناحيتين ضعيفة<br>○ الناحيتين سليمة<br>؟ إزاي تفرق ← against resistance<br>▪ حط ايدك الشمال فوق راسه علشان تثبتها فتتضمن انه يستخدم فكه مش راسه<br>▪ حط ايدك اليمين تحت فكه واضغط لفوق جامد وقوله افتح بقك<br>→ In bilateral weakness or paralysis : inability to open mouth against resistance |

2. ممكن تختبر كل Pterygoid muscle على حده (عند الطلب) :

▪ حط ايدك الشمال فوق راسه علشان تثبتها فتتضمن انه يستخدم فكه مش راسه
▪ حط قبضة إيدك اليمين على جانب الفك وقوله حاول تزق إيدي ( لاحظ انك بتختبر العضلة بتاعة الناحية المقابلة)

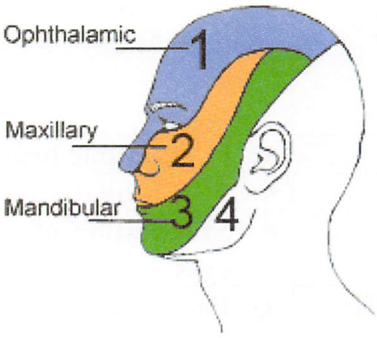
☜ انته كده بتفحص اي جزء من ال Pterygoid muscle ؟ ← بفحص ال lateral part

## 3. Sensation :

❖ **Sensation from the face are carried through trigeminal branches :**

1. Ophthalmic branch: skin over forehead
2. Maxillary branch : skin over cheeks
3. Mandibular branch : skin over lower jaw :

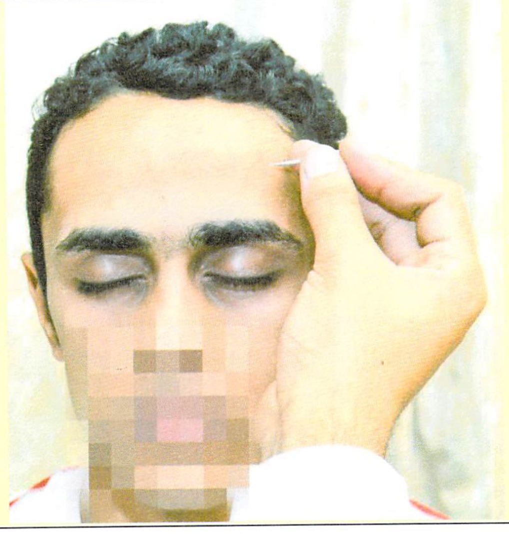
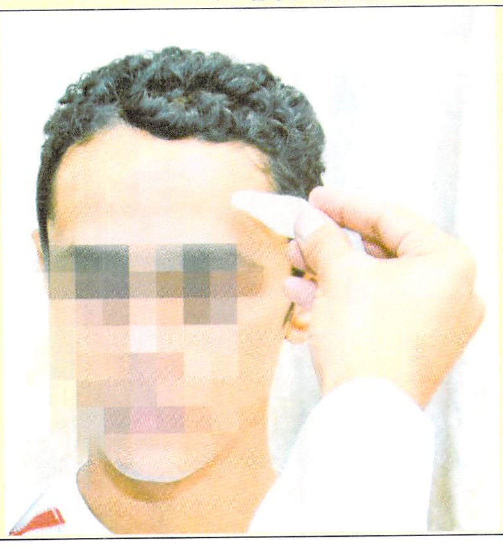
→ Except the skin over the angle of mandible which is supplied by C2

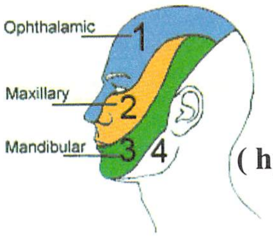


☜ طيب ليه مش C1 ؟

📖 C1 has no skin supply it's purely motor root, share with the accessory nerve.

**N.B.:**
▪ Trigeminal nerve is responsible for GENERAL sensation of anterior 2/3 of tongue

| ❖ For pain | ❖ For touch |
|---|---|
|  |  |



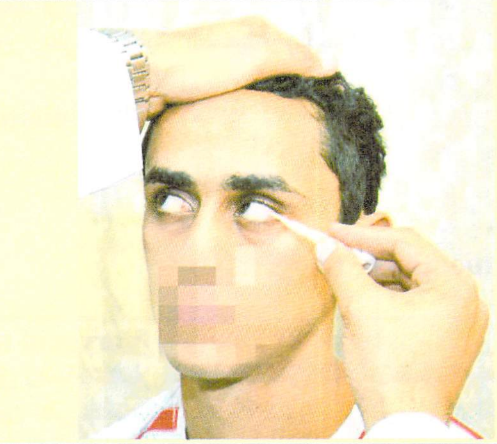
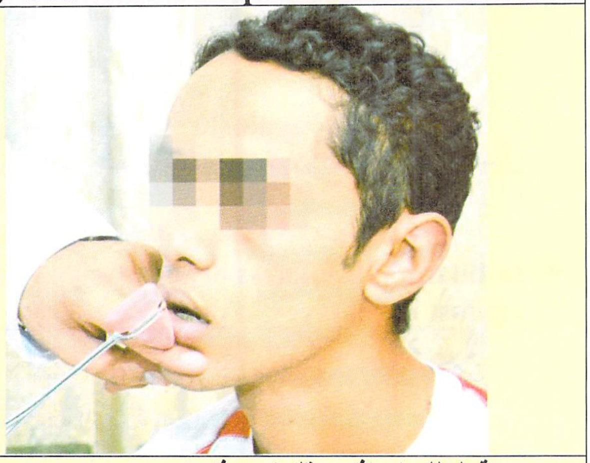
❖ طريقة الفحص: إبدأ بالسليم ودايما اسأله حاسس هنا زي هنا ؟

1) إستخدام دبوس لفحص ال **pain** , إستخدام قطنة لفحص ال **touch**
2) اطلب من العيان أنه يغمض عينيه
3) مقارنة الإحساس في الناحيتين : ناحية اليمين وناحية الشمال في الثلاث مناطق (1 , 2 , 3)
4) مقارنة الإحساس بين أربع مناطق (1 , 2 , 3 , 4 ) على ناحية واحدة ( تفرق ما بين ال **organic** وال **hysterical** )
5) مقارنة الإحساس في ناحية واحدة بين :
    - حتة **central** ← جنب الأنف
    - وحته **peripheral** ← جنب الأذن

**❖ Abnormality :**

1) Unilateral lesion of nerve: loss of sensation over same side of face sparing angle of mandible
2) Dissociative sensory loss : lesions in medulla
3) Lower face sensory loss with normal upper face: lesion in pons
4) Loss of sensation in the center of face & preserved peripheral in Tabes dorsalis (peripheral nuclear lesion)
5) Loss of sensation in the periphery of face & preserved central sensation in syringobulbia (central nuclear lesion)

## 4. Reflexes :

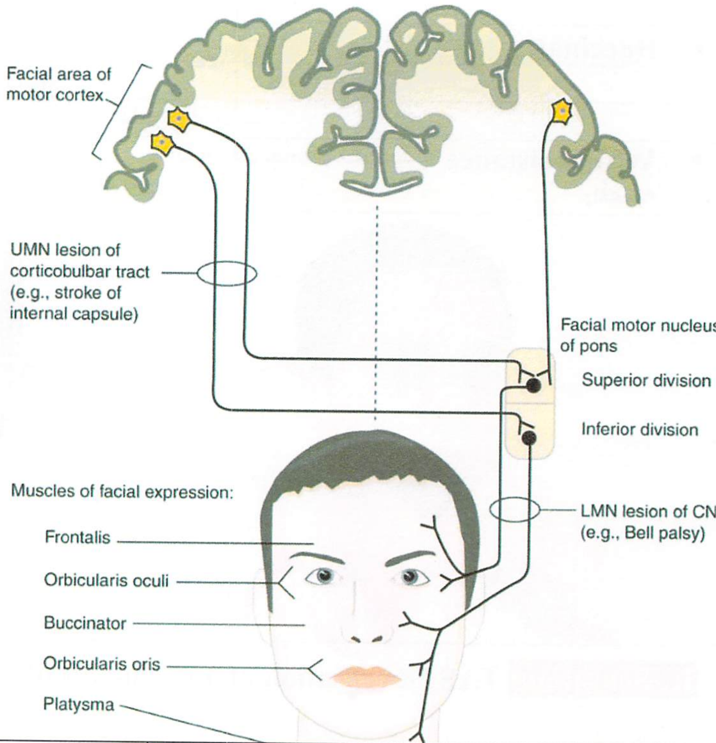
| | 1) Corneal (conjunctival) reflex : | 2) Jaw reflex "temporalis masseter reflex" |
|---|---|---|
| |  |  |
| ▪ Stimulus & technique: | ▪ قول للعيان يبص الناحية التانية , ليه ؟<br>← to avoid photic stimulation<br>▪ إعمل سن للقطنة وتعالى من جنب العيان وإلمس عينه بالقطنة | ▪ قول للعيان افتح بقك نص فتحه<br>▪ حط صباعك ال index تحت الشفة السفلى في تجويف الذقن<br>▪ اخبط صباعك بال hammer من فوق لتحت<br>▪ في الطبيعي ما يحصلش أي حاجة |
| ▪ Afferent | ▪ Ophthalmic branch of 5th CN | ▪ 5th CN |
| ▪ Efferent : | ▪ 7th CN bilaterally | ▪ 5th CN |
| ▪ Response: Normally | ▪ Stimulation of one eye → blinking of both eyes | ▪ Normally absent |
| ▪ Abnormally: | a) Facial palsy : absent blinking in same eye<br>b) Absence of blinking in both eye is seen in :<br>⇘ trigeminal affection of stimulated side<br>⇘ Bilateral facial palsy<br>⇘ Organic type of coma | • If present (closure of mouth) in bilateral UMNL above the pons e.g. in pseudobulbar palsy<br>• Jaw reflex is one of the leveling reflex in quadriplegia |
| 3) Palatal reflex : see later | | |

## CN7; Facial nerve:

**❖ Hint of anatomy :**

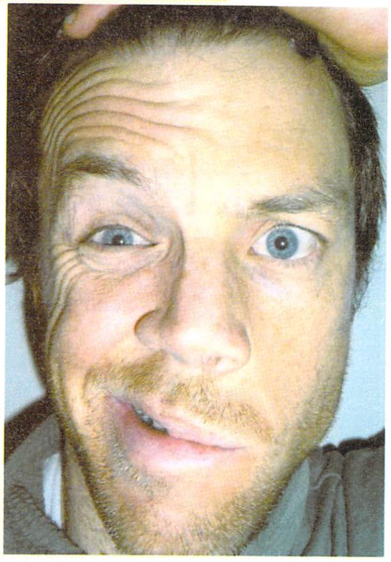
- It is a mixed cranial nerve “ sensory & motor”
- Mainly motor “ supplies facial muscles”
- Carry sensory fibers to anterior 2/3 of the tongue
- **It’s nucleus present in pons:**

| The upper part of the facial nucleus: |
|---|
| Receives bilateral pyramidal supply from both |
| The lower part of the facial nucleus: |
| Unilateral pyramidal supply from the contralateral side only |


Facial area of motor cortex
UMN lesion of corticobulbar tract (e.g., stroke of internal capsule)
Facial motor nucleus of pons
Superior division
Inferior division
Muscles of facial expression:
Frontalis
Orbicularis oculi
Buccinator
Orbicularis oris
Platysma
LMN lesion of CN (e.g., Bell palsy)

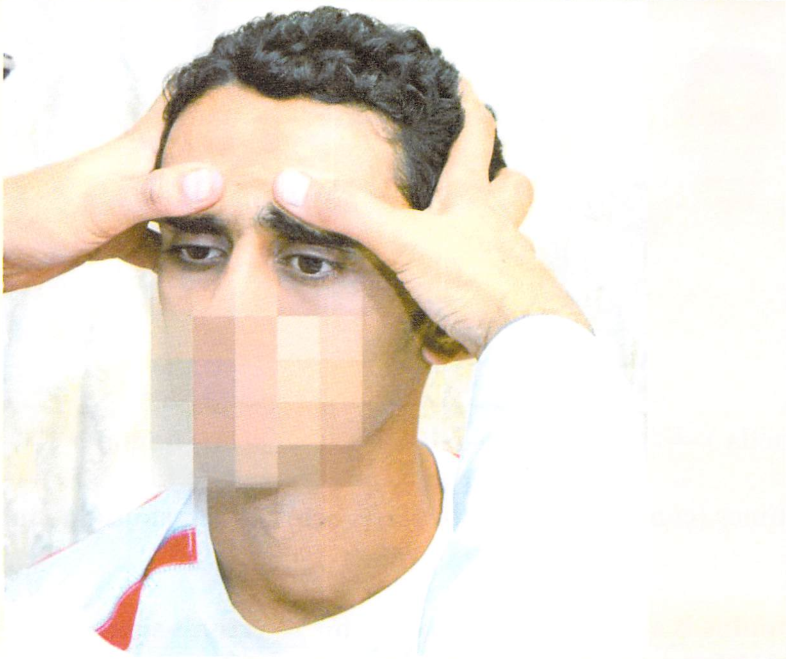
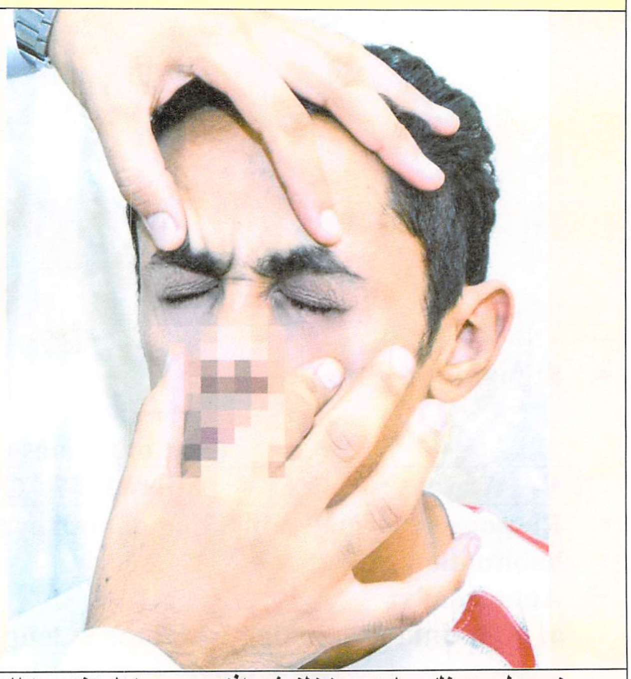
- **Possibilities of lesions:**
  - ○ Unilateral UMNL or Unilateral LMNL
  - ○ Bilateral UMNL or bilateral LMNL

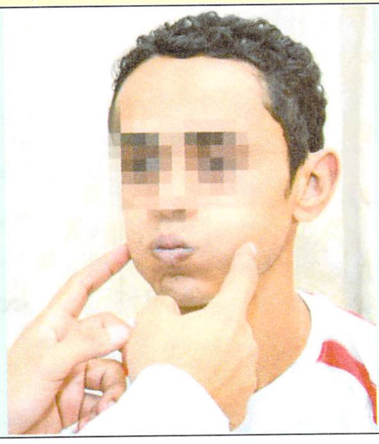
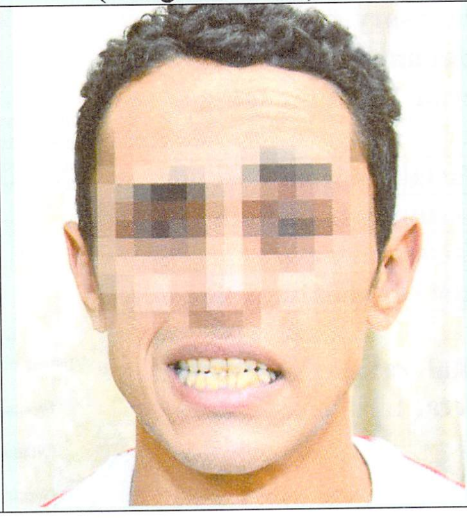
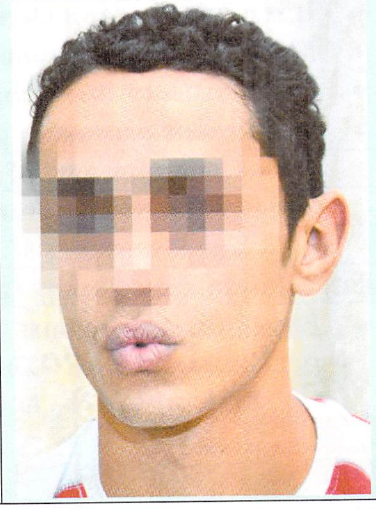
### 1. Inspection for :



| A. Upper face | | B. Lower face: | |
|---|---|---|---|
| • Frontalis muscle | • Orbicularis oculi | • Buccinator | • Retractor anguli |
| ○ Absence of corrugation of the forehead | ○ Infrequent blinking & epiphora | ○ Salivary dribbling from the diseased side | ○ Absence of nasolabial fold in the diseased side<br>○ Deviation of mouth to healthy side |

### 2. Motor power:

| A. Upper face | |
|---|---|
| • Frontalis muscle | • Orbicularis oculi |
| **Without resistance:** | |
| ○ قول للعيان: ارفع حواجبك بص للسقف<br>○ شوف الحاجبين ارتفعوا زي بعض ولا لأ<br>○ التجاعيد ظهرت على الناحيتين ولا لأ | ○ زر على عينك جامد |
| **With resistance:** | |
|  |  |
| ○ اطلب من المريض انه يرفع حواجبه ونته ضاغط بايدك جامد | ○ زر على عينك جامد ومتخلنيش افتحهم وحاول تفتحها للعيان |

| B. Lower face: | | |
|---|---|---|
| • Buccinator | • Retractor anguli | • Orbicularis oris |
| Without resistance: | | |
| انفخ بقك جامد | وريني سنانك (ما تقولش افتح بقك ) | صفر |
| ▪ With resistance انفخ بقك جامد ومتخلنيش افضيه:<br> |  |  |

**3. Sensation:** TASTE sensation of anterior 2/3 of tongue by corda tympani

❖ أنواع التذوق:

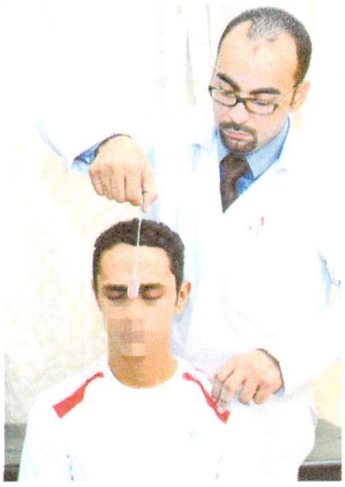
| حلو | حادق | حامض | حنضل |
|---|---|---|---|
| سكر | ملح | ليمون | صبر |

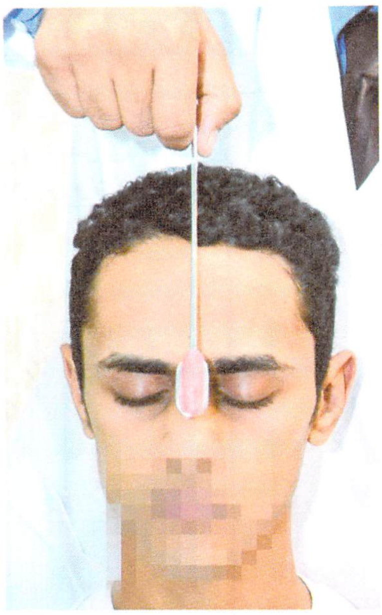
❖ طريقة الفحص:

| | | |
|---|---|---|
| 1) ممنوع العيان يتكلم أثناء الفحص | 2) العيان يغمض عينيه | 3) شد اللسان لبره ونشفه بشاشه |
| 4) اقسم اللسان يمين وشمال | 5) ضع المادة على الجزء الذي تريد اختباره | 6) يكتب أو يشاور بايده لو حاسس بالطعم |

**4. Reflexes :**

1) **Corneal (conjunctival) reflex : see before**
2) **Glabellar reflex "nasopalpebral reflex" :**





- **Stimulus :**

- قل للعيان بص للأرض أو اقفل عينك نص قفله أو سبل عينك
- امسك ال hammer من أعلى بحيث يتدلى منك وإخبط على قاعدة الأنف ( root of the nose = glabella)

- **Afferent : 7th CN**
- **Efferent : 7th CN**

- **Response: Normally:** blinking of both eyes 3-5 times (contraction of orbicularis oculi ), then stops due to habituation.

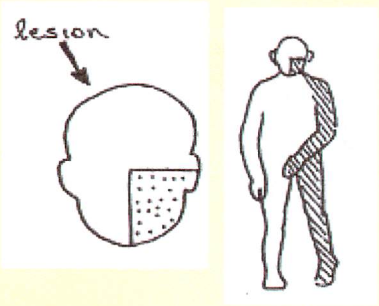
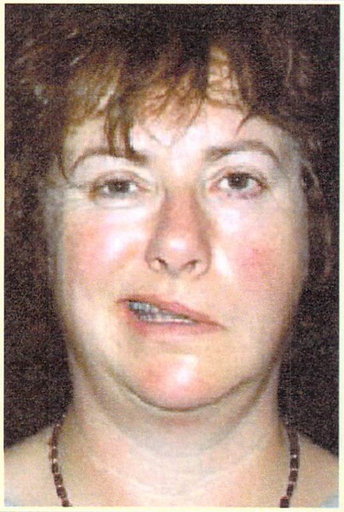
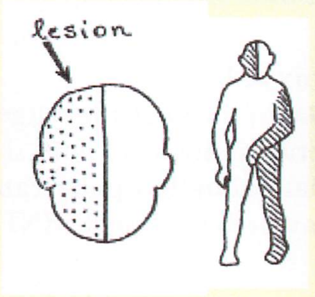
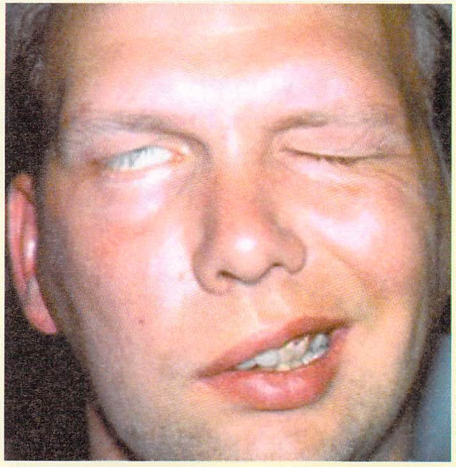
→ **Abnormally:**

a) Continuous blinking with taps as long as stimulus is applied in Parkinsonism (Myerson's sign)

b) Exaggerated in bilateral UMNL

c) Lost in bilateral LMNL

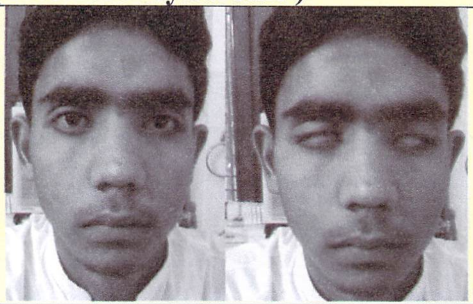
- **Difference between UMN & LMN of facial paralysis :**

| ❖ Unilateral UMNL of facial nerve | ❖ Unilateral LMNL of facial nerve |
|---|---|
|   |   |
| ▪ Affecting Δ tract above facial motor nucleus in the pons. | ▪ Affecting the facial motor nucleus or the nerve itself. |
| ▪ Paralysis of the muscles of lower half of the face on the opposite side of the lesion (supplied from the opposite Δ tract only):<br>1. Obliteration of the naso-labial fold<br>2. Dropping of the angle of the mouth with drippling of saliva<br>3. Accumulation of food behind cheek<br>4. Inability to blow the cheek<br>5. Inability to show teeth properly | ▪ Paralysis of the muscles of the upper & lower halves of the face on the same side of the lesion.<br>▪ In addition; there are:<br>6. Inability to raise eyebrows with absence of wrinkles of forehead<br>7. Inability to close the eye;<br>○ Bell's phenomenon: on firm closure of eyes → up rolling of eye balls (used to differentiate organic & hysterical facial palsy) |
| ▪ Paralysis involves the voluntary movement; it spares the emotional & associative movements (which are supplied by extra Δ fibers).<br>○ لو العيان ضحك بمزاجه ← بقه يتعوج<br>○ لو ضحكته من قلبه ← ما يتعوجش | ▪ Paralysis affects voluntary, emotional & associative movements. |
| ▪ Paralysis is associated with hypertonia & hyperreflexia. | ▪ Paralysis is associated with hypotonia & hyporeflexia. |
| ▪ There is associated hemiplegia on the same side of the facial paralysis. | ▪ If there is hemiplegia, it is on the opposite side of the facial paralysis (crossed hemiplegia). |

❖ **Bilateral UMNL OR bilateral LMNL of facial nerve: taking all the face ;**

❖ **Causes of bilateral facial palsy: Mnemonic : Bull DOG LIMPS**

- ○ Bull = Bulbar palsy, Basilar skull fracture and Botulism
- ○ D = Diabetes Mellitus
- ○ O = Osteopetrosis
- ○ G = Guillain-Barre syndrome
- ○ L = Leukemia , Leprosy and Lyme disease
- ○ I = Isoniazid and Infectious mononucleosis
- ○ M = Myasthenia gravis , Myotonica dystrophia , Meningitis , Moebius syndrome and Malaria
- ○ P = Periarteritis nodosa, Poliomyelitis , Porphyrias and Postvaccination neuropathy
- ○ S = Syphilis and Sarcoidosis ( Heerfordt syndrome )



| ▪ Bilateral UMNL of facial nerve: | ▪ Bilateral LMNL of facial nerve |
|---|---|
| → Differentiation by : | |
| ▪ Exaggerated glabellar reflex | ▪ Lost glabellar reflex |
| ▪ Present Jaw reflex | ▪ Absent Jaw reflex |

## Bulbar CN: CN 9; Glossopharyngeal, CN10; vagus, CN11; cranial part of accessory nerve

❖ **Introduction:**

- They supply palate, pharynx & larynx
- Lesion in them called : palate-pharyngeo-laryngeal paralysis = bulbar palsy
- Pyramidal tract supplies cranial nuclei of both sides of bulbar nerve so :
  - Unilateral lesion i.e. unilateral bulbar palsy can occur but is always of = LMNL
  - While bilateral lesion may be UMNL or LMNL

### 1. Inspection & Motor Power :

- قول للعيان يفتح بقه
- نزل اللسان ب tongue depressor
- استخدم torch وبص على ال base of the uvula ( مش على ال tip لأن ال tip أصلا deviated )

→ **Uvular deviation to healthy side :** contralateral unilateral LMNL

→ **IF central uvula :** خلي العيان يقول آآآه

- Symmetrical elevation of soft palate : Normal
- Non mobile uvula and palate : Bilateral palsy either in bilateral UMNL or bilateral LMNL

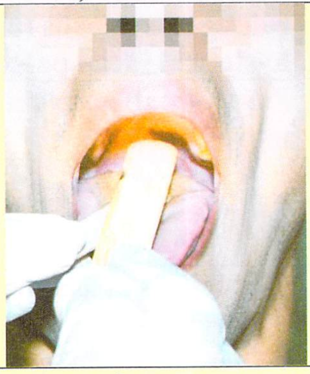
### 2. Sensation :

- GENERAL & TASTE sensation of posterior 1/3 of the tongue

↳ **How to test taste sensation in posterior 1/3 of tongue?**

📖 It's tested by using electric current (4 mill-ampere) → metallic taste

### 3. Reflexes :

| | 1) Palatal reflex | 2) Pharyngeal reflex "gag reflex" |
|---|---|---|
| |  | |
| ▪ Stimulus | ▪ 2 tongue depressor; one depresses the tongue & the other touching the soft palate | ▪ 2 tongue depressor; one depresses the tongue & the other touching the pharynx (posterior pharyngeal wall) |
| ▪ Afferent | ▪ 5th CN | ▪ 9th CN |
| ▪ Efferent | ▪ 10th CN | ▪ 10th CN |
| ▪ Response : Normally | ▪ Elevation of soft palate slowly | ▪ Gag; if the patient annoyed, feel the desire to vomit |
| ▪ Abnormally : | ▪ No elevation of soft palate : bilateral LMNL<br>▪ Exaggerated elevation of soft palate : bilateral UMNL | ▪ No annoyance: bilateral LMNL<br>▪ Exaggerated response : the patient vomits: bilateral UMNL |

↵ إزاي تقدر تفحص ال vagus nerve لوحده ؟

📖 Indirect laryngoscope to observe position & movements of vocal cords

↵ هل ممكن ال glossopharyngeal nerve يتصاب لوحده ؟

📖 آه ممكن بس rare جدا زي مثلا حالة neuroma of glossopharyngeal nerve

↵ ليه rare ؟

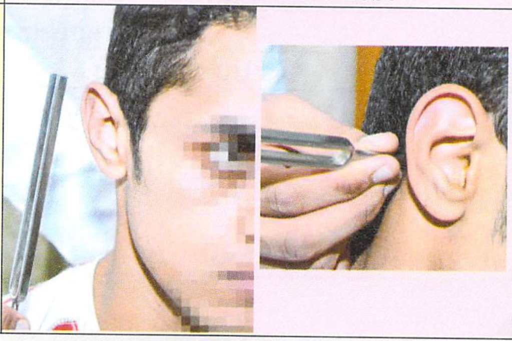
📖 لانه في الغالب بيتأثر معاه 10 & 11 N لأنهم طالعين من ال jugular foramen وبيكون اسمها Vernet's syndrome

↵ إزاي تفرق ما بين ال Bilateral UMNL وال Bilateral LMNL ؟

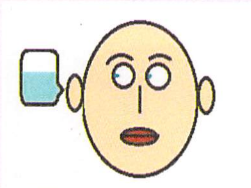
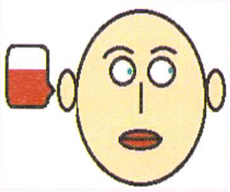
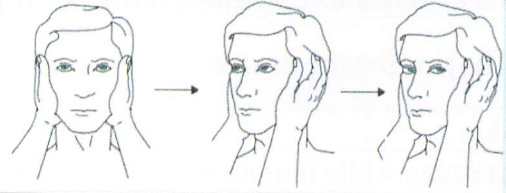
| | ▪ Bilateral UMNL = pseudo-bulbar palsy | ▪ Bilateral LMNL = true-bulbar palsy |
|---|---|---|
| → Differentiation by | | |
| ▪ 5th CN | ▪ Exaggerated jaw reflex | ▪ Absent |
| ▪ 7th CN | ▪ Exaggerated glabellar reflex | ▪ Lost glabellar reflex |
| ▪ 9th & 10th CN | ▪ Exaggerated palatal & pharyngeal reflex | ▪ Lost palatal & pharyngeal reflex |
| ▪ 12th CN | ▪ Spastic tongue<br>▪ No fasciculation | ▪ Flaccid, atrophic tongue<br>▪ Fasciculation |

## CN 8; Cochleo-Vestibular nerve

### A. Cochlear part : test for acuity of hearing using :

| 1. Watch test | 2. Rinne's test | 3. Weber's test |
|---|---|---|
| |  | |
| | ❖ Technique : | |
| ○ The acuity of the patient's hearing is compared to that of the examiner's<br>○ If there is diminution of patient acuity for hearing do the following test | ○ Using vibrating tuning fork, compare air conduction (in front of ear) with bone conduction (on mastoid process) | ○ Place tuning fork in the middle of head |
| | ❖ Normally : | |
| ○ The hearing of the patient is similar to the examiner | ○ Air conduction is better than bone conduction | ○ The vibrations are heard in the middle of forehead |
| | ❖ Nerve deafness : | |
| ○ The hearing of the patient is less than the examiner | ○ Both air and bone conductions are diminished | ○ The vibrations are heard in the normal ear |
| | ❖ Conductive deafness : | |
| ○ The hearing of the patient is less than the examiner | ○ Bone is better than air | ○ The vibrations are heard in the affected ear |

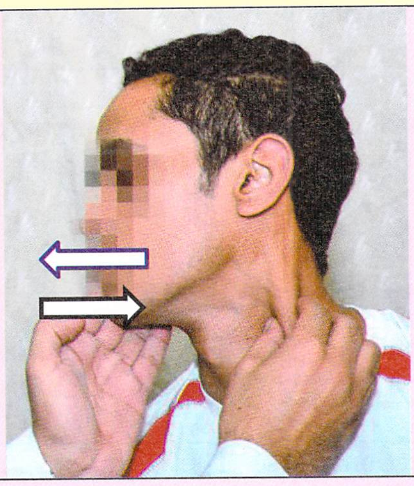
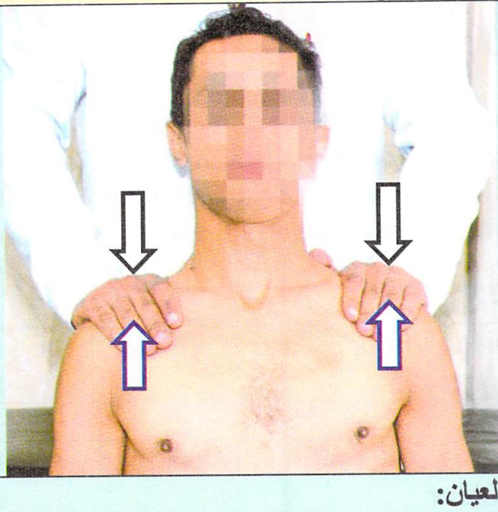
### B. Vestibular part :

| 1. Vestibulo-ocular reflex or caloric reflex test: | 2. Oculo-cephalic reflex, or doll's eyes reflex: |
|---|---|
|   |  |
| ❖ Aim : | |
| • Assess function of internal ear | • Bed side test to evaluate vestibular functions<br>• Differentiate between causes of nystagmus |
| ❖ Technique : | |
| • Patient lie supine, his head flexed 30° so that the lateral semicircular canal is vertical → generate a maximal response<br>• Each ear is douched with water for 40 seconds :<br>• 30° C (7° below normal)<br>• 44° C (7° above normal) | • Patient lies on his back, with his shoulder at the end of the bed. His head, projecting beyond bed, is supported by examiner hand<br>• Head is then fully extended and turned to one side<br>• Patient's eye should remain open<br>• After a short interval, test should be repeated with head extended and rotated to other side |
| ❖ Results : | |
| • If the water is warm → Both eyes will turn toward the contralateral ear, with horizontal nystagmus to the ipsilateral ear.<br>• If the water is cold, → both eyes then turn toward the ipsilateral ear, with horizontal nystagmus to the contralateral ear.<br>• Absent reactive eye movement → vestibular weakness of the side being stimulated<br>• If the eye movement & nystagmus are absent → brainstem reflexes are damaged | ❖ Normally :<br>• A positive response occurs when the eyes conjugately deviate in the direction opposite to the head's rotation; thus indicating that the brainstem (CN3, 6, 8) is intact.<br>❖ Abnormally :<br>→ Nystagmus (may appear within 10 seconds) :<br>• If it remains < 1 minute : lesion in inner ear (same side)<br>• If it remains > 1 minute : lesion in 8th nerve or cerebellum |

## CN 11; accessory nerve

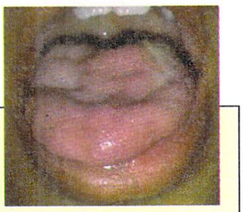
❖ **Has 2 parts:**

1) **Cranial accessory part:** distributed with vagus nerve
2) **Spinal accessory part:**

<table>
<tr><td>• <b>Stemomastoid :</b></td><td>• <b>Trapezius:</b></td></tr>
<tr><td colspan="2"><b>1) Inspection :</b></td></tr>
<tr><td>○ <b>Head tilt to affected side</b></td><td>○ <b>Shoulder depression</b></td></tr>
<tr><td colspan="2"><b>2) Motor power:</b><br>لازم:<br>○ ال muscle تكون exposed<br>○ تواجه العضلة<br>○ Against resistance</td></tr>
<tr><td></td><td></td></tr>
<tr><td>❖ من قدام العيان :<br>1. كل عضلة لوحدها: ( كل عضلة تزق الرقبة الناحية العكسية)<br>○ حط إيدك على جنب فكه وقوله زق إيدي وحس العضلة الناحية التانية<br>○ حط ايدك التانيه بنفس الطريقة وحس العضلة الأخرى<br>2. العضلتين مع بعض: ( العضلتين مع بعض يزقوا الرقبة لتحت)<br>○ حط إيدك تحت ذقنه وقوله زق إيدي وشوفهم وحسهم الاتنين</td><td>❖ من وراء العيان:<br>○ حط إيدك الإتنين على كتف العيان وزق وقوله ارفع كتافك فوق</td></tr>
<tr><td colspan="2">• <b>N.B.: sternomastoids & trapezius are proximal muscles, so receive pyramidal supply from both sides</b></td></tr>
</table>

## CN 12; hypoglossal nerve

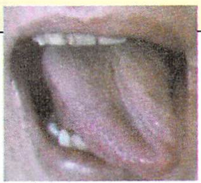
1. **Inspection :**



<table>
<tr><td>• <b>Fasciculations</b> while tongue inside the mouth.<br>○ يمنع الحكم عليها وال tongue بره الفم ,<br>ليه ؟ ← physiological fasciculations<br>○ تطلب من العيان يفتح بقه<br>○ تستخدم torch وتشوف ال fasciculations</td><td>• <b>Wasting</b> which indicating LMNL<br>○ ال .m.m بتاع ال tongue بقى على شكل folds أكن هدومه وسعت عليه</td></tr>
</table>

2. **Motor :**

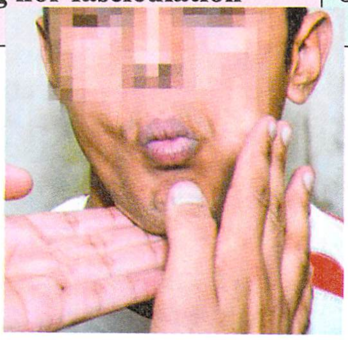
A. **Without resistance:** إطلب من العيان أنه يطلع لسانه لبره



○ **If deviated → it towards the paralyzed muscles فكسان عيان, unilateral paralysis, either UMNL or LMNL**

| UMNL | LMNL: |
|---|---|
| ○ **Unilateral: deviation to opposite side of lesion** | ○ **Unilateral : deviation to same side of lesion** |
| ○ **Bilateral: inability to protrude tongue (spastic tongue)** | ○ **Bilateral : inability to protrude tongue** |
| ○ **In both cases there is no wasting nor fasciculation** | ○ **In both cases there is wasting & fasciculation, tongue is sickle, corrugated & wasted** |

B. **With resistance:**

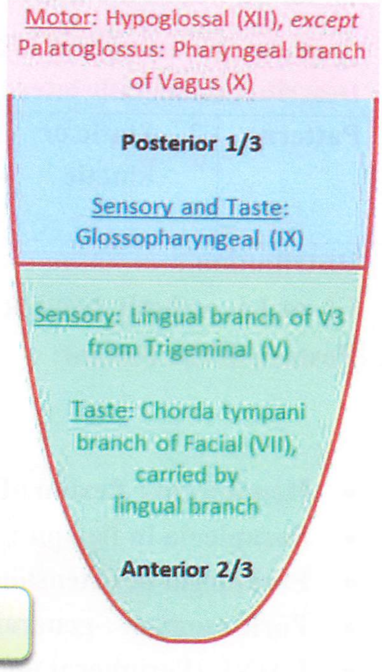


○ تزق من بره بصباعك ولسان العيان يزق إيدك من جوه

❖ **N.B.:**

○ كثيرا عندما تفحص عيان ال **hemiplegia** تجد ال 7th CN مصاب وال 12th CN سليم ... لأن :

○ They have bilateral supply for CN 12 (50 % of people)
○ May be affected then recovered ( DD by history)


Motor: Hypoglossal (XII), except Palatoglossus: Pharyngeal branch of Vagus (X)
Posterior 1/3
Sensory and Taste: Glossopharyngeal (IX)
Sensory: Lingual branch of V3 from Trigeminal (V)
Taste: Chorda tympani branch of Facial (VII), carried by lingual branch
Anterior 2/3

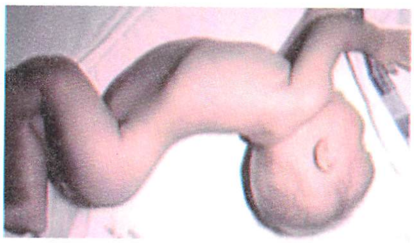
❖ **What are abnormal movements of tongue ?**

○ Fasciculations : nuclear lesion in motor neuron disease & syringobulbia
○ Involuntary movements as in chorea
○ Dimpling of the tongue on tapping it, in cases of myotonia.
○ Tremors in parkinsonism

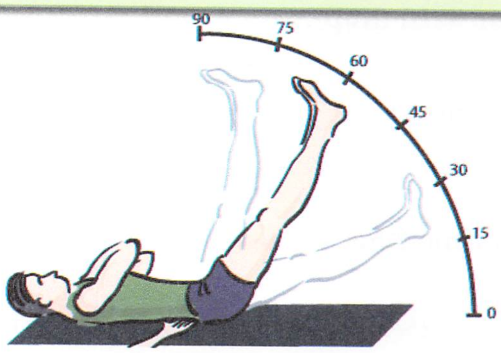
❖ **What is the Nerve supply of the tongue?**

- Motor : hypoglossal nerve except palatoglossus by pharyngeal branch of CN10
- Sensory:
  - → Anterior 2/3 :
    - ○ Taste sensation : 7tn CN
    - ○ General sensation : 5th CN
  - → Posterior 1/3 : taste & general sensation : 9th CN

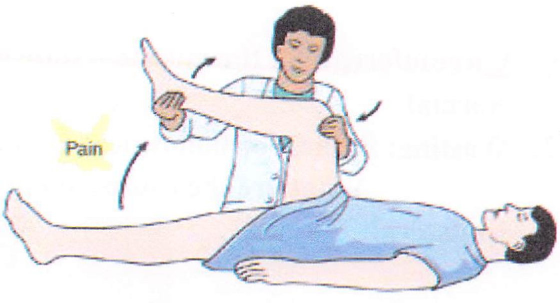
## 4. Meningeal Irritation = Examination of neck



Opithotonus


90
75
60
45
30
15
0

Lassegue's sign



Kernig's sign

❖ **Meningeal irritation signs :** positive in meningitis, sciatica, subarachnoid hemorrhage

1. **Neck rigidity**
2. **Opithotonus** (high arched back)
3. **Lassegue's sign :**

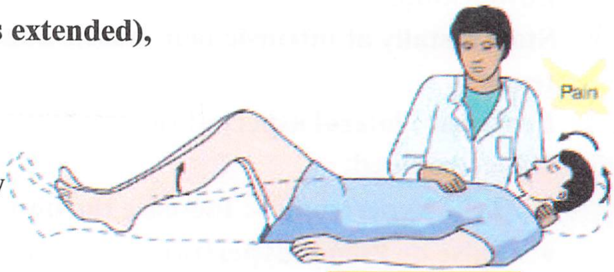
- Raise the leg of a supine patient by flexion of hip (while the knee is extended),
- Normally it can be raised to 90° without discomfort.
- Abnormally : it is painful & limited before 90°

4. **Kernig's sign :**

- Flex hip & knee at 90° in supine patient, then extend the knee slow
- Abnormally : extension is limited & painful

5. **Brudzinski's sign:**

- Neck sign : passive flexion of neck leads to flexion of both knees and hips
- Leg sign : passive flexion of one hip leads to flexion of the other hip and knee



Neck sign

## 5. Examination of motor system

| | | | | |
|---|---|---|---|---|
| 1. Inspection of the muscle state | 2. Palpation for the muscle tone | 3. Percussion for fasciculation & myotonia | 4. Power | 5. Co-ordination |

❖ قواعد الفحص:

| | | | | |
|---|---|---|---|---|
| 1. Expose four limbs | 2. نظم نفسك | | | |
| | a) Start by healthy side, then diseased side; compare both | b) UL then LL | c) Distal then proximal | c) Use your both hands |

❖ شروط خاصة حسب الاختبار

## 1. Inspection:

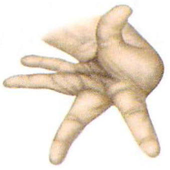
**A. Abnormal Involuntary Movements** e.g. athetosis, pathological fasciculations, chorea, dystonia & tremors.

**1. Describe: see details later in Parkinsonism case.**

| 1. Pattern | 2. Static or kinetic | 3. Slow or rapid | 4. Regular or irregular | 5. Fine or flappy (coarse) tremors | 6. Factors that increase & decrease the movement |
|---|---|---|---|---|---|

**2. Distribution :**

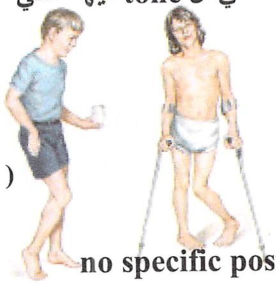
- UL or LL or both, head & neck, Unilateral or bilateral , Distal or proximal



**B. Posture of the Patient:**

- يحكم عليه مرتين , مرة والعيان واقف , ومرة وهو نايم
- الجسم يأخذ شكل العضلات اللي ال tone فيها عالي

- **Hemiplegia :** flexion of UL & Extension of LL
- **Paraplegia in flexion :** flexion of both LL
- **Paraplegia in extension :** extension of both LL
- **Parkinsonism :** generalized flexion attitude (Gorilla like ما تقولش )
- **LMNL (Peripheral neuropathy) :** foot or wrist drop



- لو مافيش تقول ← no specific posture

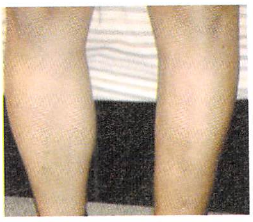
**C. Circumference of the muscle = state of the muscle:**

1. Normal
2. Wasting: flatness or hollowness of muscles:

? What are the causes of muscle wasting? See discussion later.

**A. Unilateral:**

**B. Bilateral:**



- ○ قارن الناحيتين ببعض في نفس المكان وقسهم بالمازورة ( إبدأ بالناحية السليمة)
- ○ قارن أجزاء ال limb ببعضها مثلا مقارنة ال thigh وال leg في ال limb الواحد

→ **Wasting landmarks::**

✌ **Upper limbs:**

↳ Start distally at interossei, thenar, hypothenar leading to prominent metacarpal bones & tendons

↳ Proximal: flat shoulder

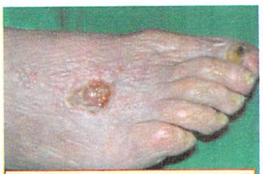
✌ **Lower limbs:**

↳ Start distally at intrinsic foot muscle and interossiei leads to pes cavus and prominent metatarsal bones & tendons

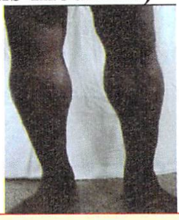
↳ Proximal : lateral aspect of the leg & medial aspect of thigh (vastus medialis)

3. **Hypertrophied:**
   - **True hypertrophy :** increase the power
   - **False or Pseudohypertrophy :** decrease the power

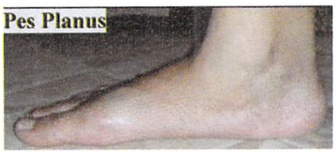
? What are the causes of Pseudohypertrophy? See discussion later.



Trophic changes



Pseudohypertrophy



Pes Planus

**D. Dysplastic (Trophic) changes:**

❖ Fall of hair, brittle nails, trophic ulcers, thin skin, loss of SC fat & Charcot's joint

? What are the diseases with marked tropic changes? See discussion later.

**E. Deformity in the skeletal system:**

❖ Abnormal position (claw hand, dropped foot)

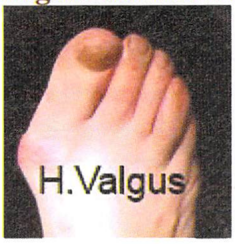
❖ Pes cavus (high arched foot)

❖ Pes plannus (flat foot)

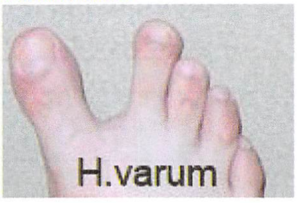
❖ Hallux valgus or varum

❖ Hammer toes & Talipes equinovarus

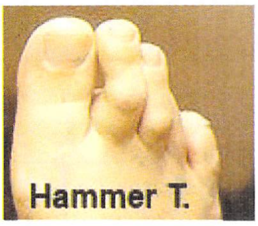
? What are the causes of pes cavus? See discussion later.



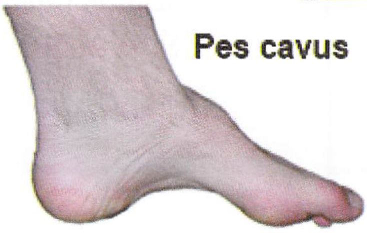
H.Valgus



H.varum



Hammer T.



Pes cavus

## 2. Palpation of muscle tone:

☠ شرط خاص هنا ← لازم تقول للعيان سيب نفسك

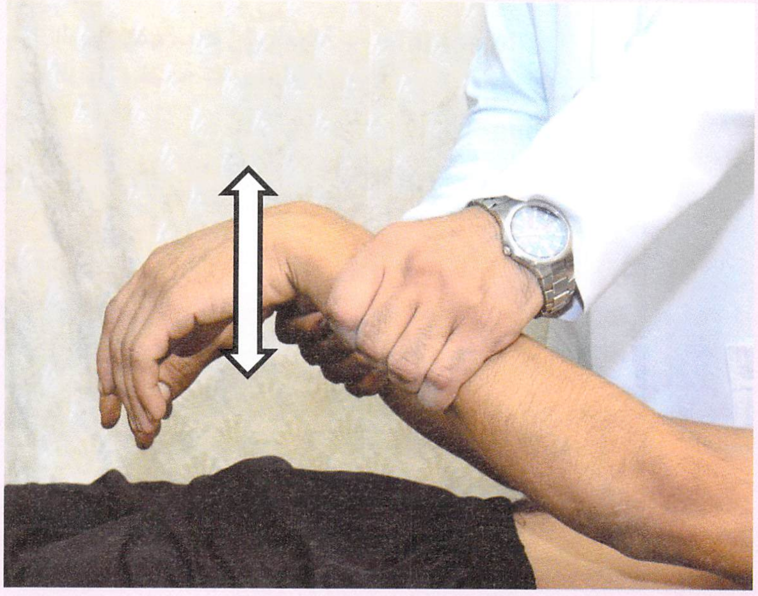
### A. In Upper limbs

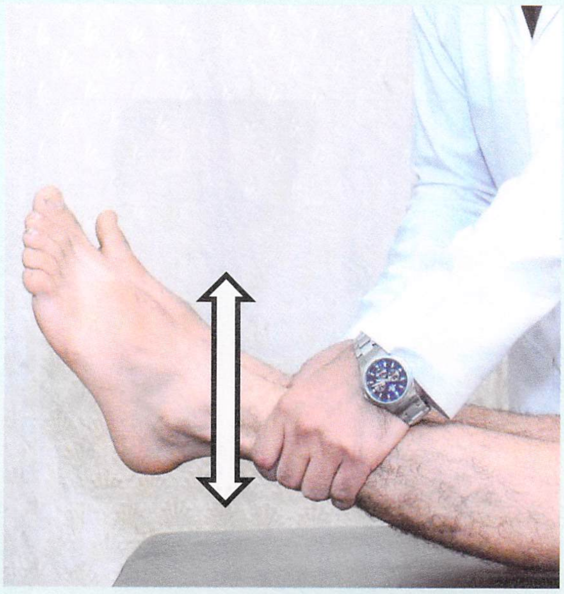
**1. Wrists by Shaking method**

### B. In lower Limbs

**1) Ankles by Shaking method**

- ❖ اليد اليمين تمسك اليد أو القدم اليمين , اليد الشمال تمسك اليد أو القدم الشمال ( اليمين باليمين والشمال بالشمال )
- ❖ يتم فحص الناحيتين مع بعض
- ❖ تهز من فوق لتحت أو من الجنب للجنب

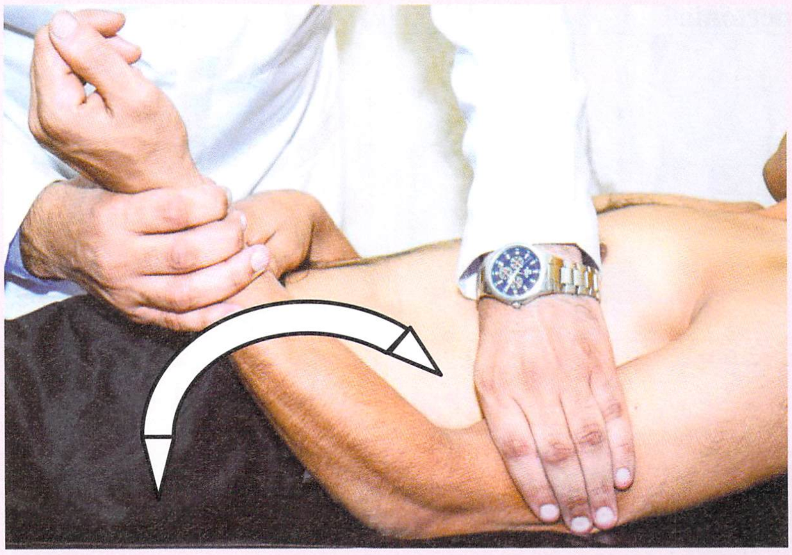


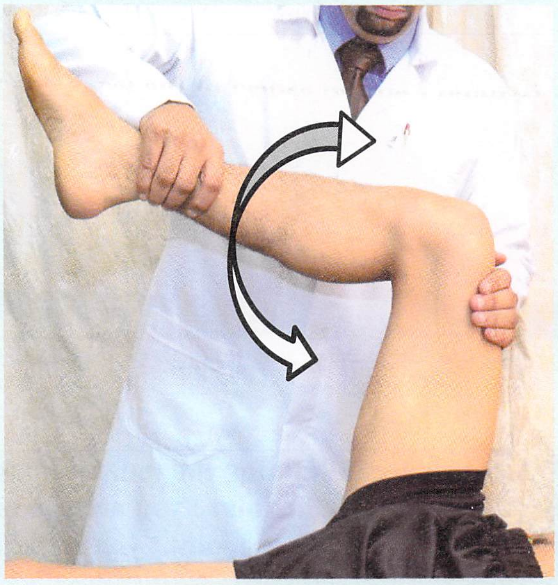


**2. Elbows by Passive flexion & extension**

**2) Knees by Passive flexion & extension**

- إيدك الشمال تثبت المفصل اللي قبل الذي تختبره
- إيدك اليمين تثني وتفرد ال limb
- لو الحالة hypertonia :
  - لو ال tone عالي في الأول ويسيب في الأخر ← spasticity (clasp Knife)
  - لو ال tone عالي من الأول للأخر ← rigidity : لو معهاش tremors اسمها lead pipe , لو معاه tremors اسمها Cog wheal



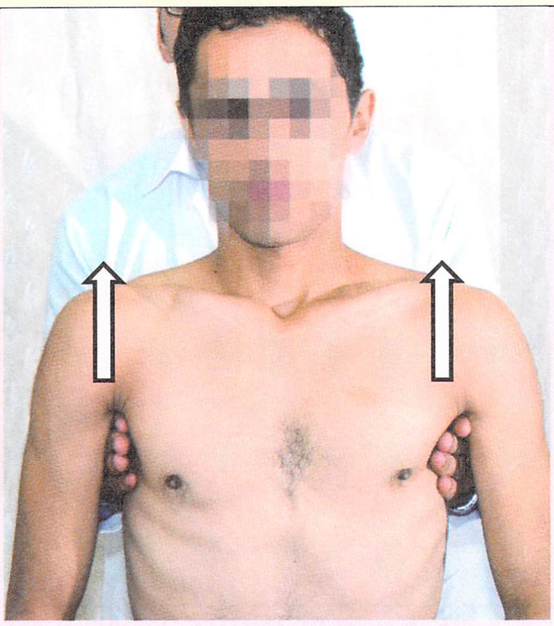


### 3) Shoulder: Gower's test

- المريض جالس والدكتور وراه
- إستخدم إيديك الاتنين
- حط إيدك تحت باطه في الناحيتين معا
- واخطف الكتف لفوق

❖ النتيجة:

- ○ الكتف يطلع وينزل طبيعي ← normotonia
- ○ الكتف كأنه هيتخلع ← hypotonia
- ○ الكتف ناشف ← hypertonia



### 4) Hip :

- خلي العيان يفرد رجليه على الآخر
- ضع إيديك اليمين فوق ال ankle وإيديك الشمال فوق ال knee
- ثم:

**A. Rolling technique:**

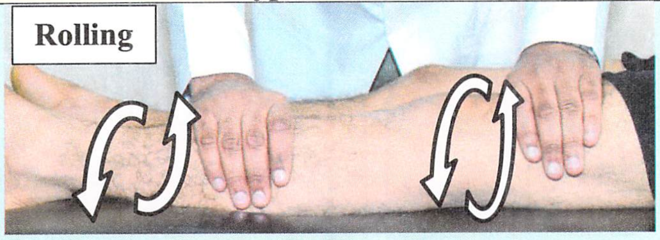
- دحرج رجله رايح جاي

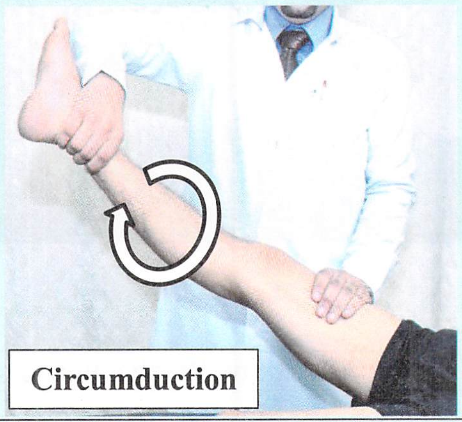
**B. Circumduction:**

- ارفع رجل العيان ولفها في حركة دائرية

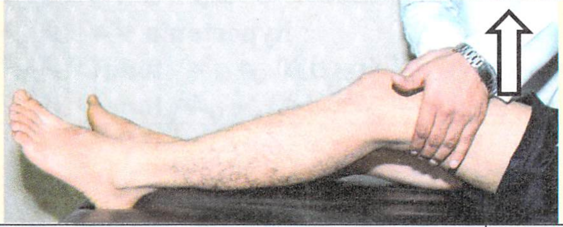
❖ النتيجة:

- ○ الرجل تلف معاك زي العجلة ← hypotonia
- ○ الرجل مخشبة ← hypertonia



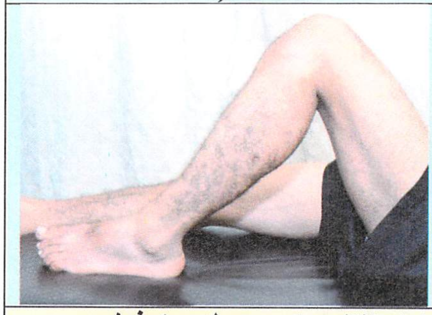
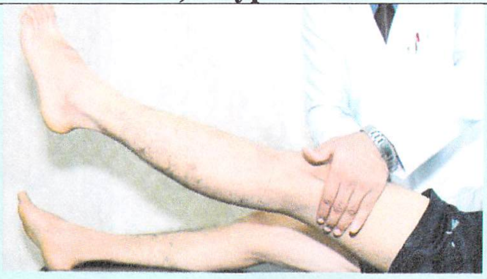
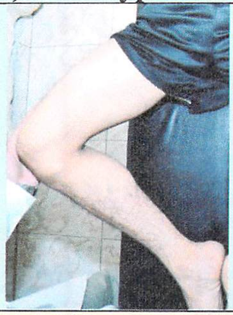


### 5) Both Hip & Knee by Passive elevation: طريقة الخطف



- حط إيدك تحت distal thigh ورجله مفروده على السرير واخطف لفوق وسيب
- مميزات طريقة الخطف : تختبر ال tone في ال knee وال hip
- عيوب طريقة الخطف : متحددش أنواع ال hypertonia

❖ النتيجة :

| a) Normal | b) Hypertonia | c) Hypotonia |
|---|---|---|
|  |  |  |
| ○ ركبته تنتني وكعب رجله ميترفعش | ○ رجله كلها تطلع حته واحدة زي المسطرة | ○ ركبته تنتني ورجله تطلع لبره<br>○ If hypotonia is bilateral → frog position |

- ○ When you are examining the tone compare it in flexors or extensors
- ○ If you are flexing the joint : you are examining the extensors
- ○ If you are extending the joint : you are examining the flexors

❖ Results :

a) Minimal resistance : normal tone
b) No resistance : hypotonia (flaccidity)
c) Marked resistance : hypertonia either:

- ○ Clasp knife spasticity = pyramidal tract lesion or
- ○ Rigidity = extrapyramidal; lead pipe or {cog wheel interrupted by tremors}

❖ What are the causes of hypotonia & hypertonia? See discussion later.

❖ What are other Gower's you know? See discussion later.

## 3. Percussion:

### 1) Fasciculations:

- **Definition :** Fasciculation means spontaneous contraction of GROUP of muscle, it's visible & even palpable
- **N.B.:** Fibrillation means spontaneous contraction of SINGLE muscle fiber, it's hardly visible except in tongue
- **Types:**

| | Physiological fasciculation | Pathological fasciculation |
|---|---|---|
| Cause | Anxiety, fatigue, coffee, smoking | Irritation of AHCs |
| Type | Coarse | Fine |
| Wasting | Absent | Present |
| EMG | Normal | Giant potentials |

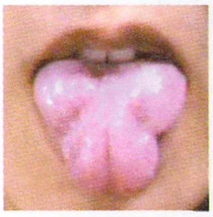
عندما تختبرها لازم تكون ال muscles غير مجهدة , ليه ؟

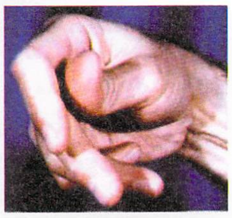
- علشان to avoid physiological fasciculations علشان كده تختبر قبل اختبار ال Power

- **Technique :**All limbs percussed by finger flickering or by light percussion by hammer

### 2) Myotonia :

- **Definition :** delayed relaxation of skeletal muscle after muscle contraction (myotonic phenomena)
- **How to examine:**





a. **Mechanical myotonia:** by percussion by hammer on:

- Tap of thenar eminence → adduction of thumb with delayed abduction
- Tap of the tongue → dimple formation

b. **Voluntary myotonia :**

- Ask the patient to catch anything or shake hand or clinch fist → patient is unable to open hand except very late

c. **Electrical myotonia:**

- 2-3 milliampere are enough to produce muscle contraction; hyperexcitable (normally 6 milliampere is needed)

- **Types:**

| | | | |
|---|---|---|---|
| A. Myotonia congentia (hypertrophica) | B. Myotonia atrophica | C. Myotonia acquisita | D. Myotonia paradoxica |

## 4. Muscle Power:

❖ شروط خاصة بهذا الإختبار:

1. نظم نفسك في كل مفصل في الحركات بهذا الترتيب :
   - Flexion ➔ extension
   - Abduction ➔ adduction
   - External rotation ➔ internal rotation
2. اعمل الإختبارات مرة without resistance ومرة against resistance :

   أ) Without resistance :
   - ادي العيان الأمر وأنت بتمثل الحركة بايدك

   ب) Against resistance :
   - إيدك اليمين تعمل resistance وإيدك الشمال تثبت المفصل اللي قبل الذي تختبره وقول للعيان قاومني
3. الحركة اللي العيان معرفش يعملها من نفسه without resistance , من الطبيعي انك ما تختبرهاش against resistance

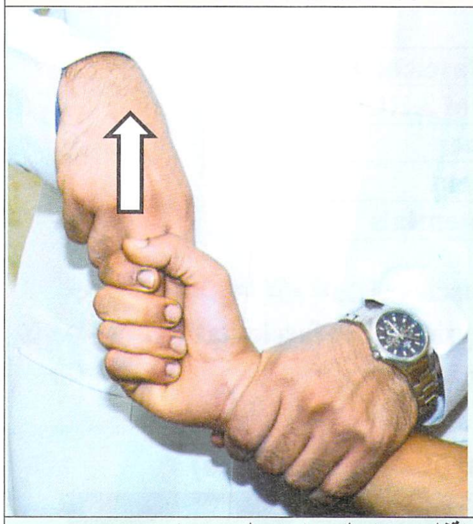
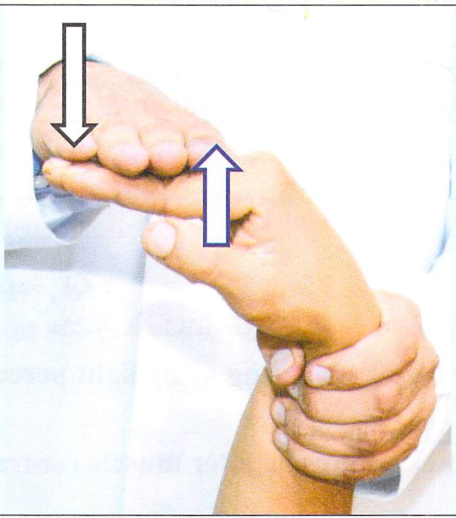
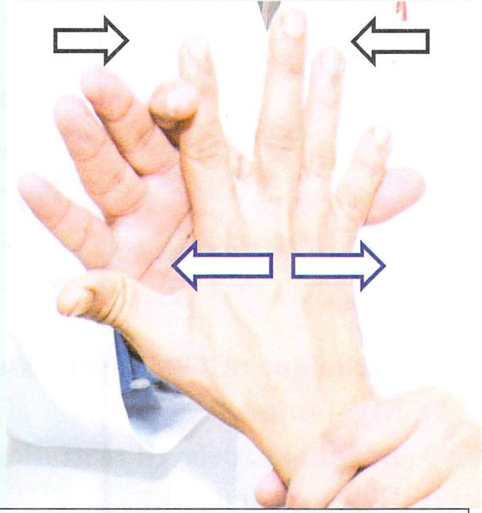
❖ **Result of examination : Grades of muscle power:**

| ❖ Grade : | ❖ Muscle power: |
|---|---|
| 0. | ○ No muscle contraction visible (complete paralysis) |
| 1. | ○ Muscle contraction visible without joint movement (flicker; Twitches) |
| 2. | ○ Movement after elimination of effect of gravity |
| 3. | ○ Movement against gravity, but without resistance |
| 4. | ○ Movement against gravity, with some resistance |
| 5. | ○ Normal, Movement against gravity, with Full resistance |

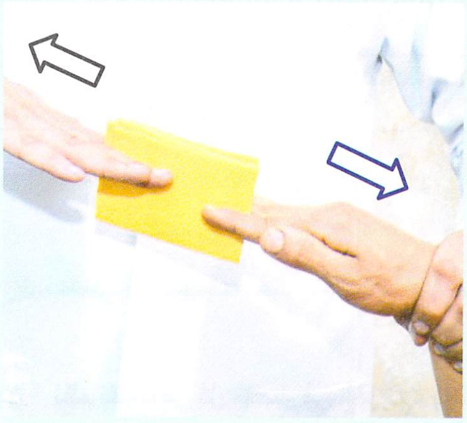
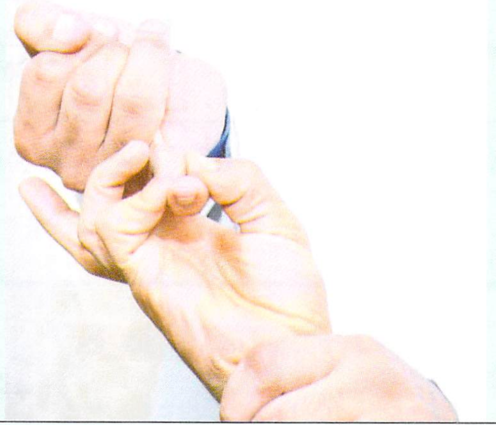
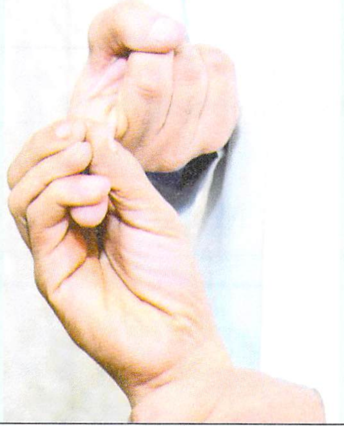
## I. Upper limbs

### 1. Hand; fingers صوابعك

✌ Without resistance

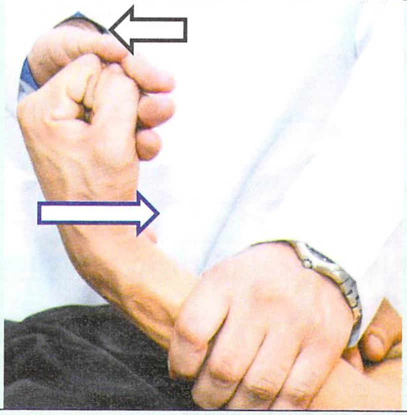
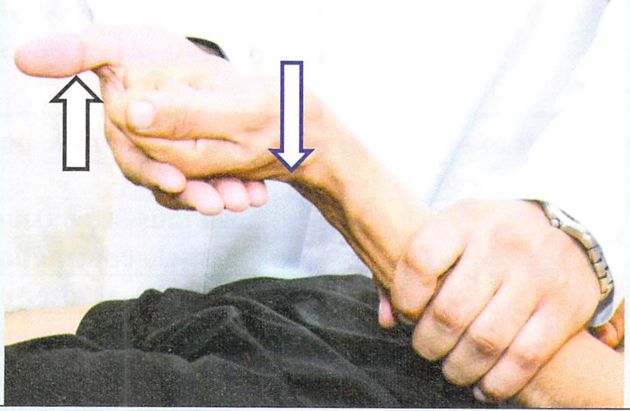
| ○ Flexors (flexor digitorum)<br>اقفل – اتني- صوابعك | ○ Extensors (extensor digitorum) افتح – افرد- صوابعك | ○ Abductors (dorsal interossei)<br>فنطهم – إبعدهم |
|---|---|---|
| ✌ With resistance | إيدك اليمين تعمل resistance وإيدك الشمال تثبت ال wrist | |
|  |  |  |
| ○ اقفل صوابعك جامد على صوابعي .. متخلنيش أطلعهم قاومني (hand grip)<br>☝ للتميز أوي كمل وقوله افتحهم بسرعه: ليه ؟<br>🕮 To exclude voluntary myotonia | ○ افرد صوابعك جامد ... متخلنيش اتنيهم ... قاومني | ○ ابعد صوابعك جامد ... متخلنيش اضمهم ... قاومني |

✌ Without resistance

| ○ Adductors (palmar interossei)<br>ضمهم | ○ Opposition (opponens pollicis)<br>سبح – عد على صوابعك | ○ Lumbricals : إعمل وضع الكتابة |
|---|---|---|
| ✌ With resistance | إيدك اليمين تعمل resistance وإيدك الشمال تثبت ال wrist | |
|  |  |  |
| ○ ضم صوابعك على الورقة جامد ... متخلنيش اشدها ... قاومني | ○ اعمل حلقة بصباعك الصغير على الكبير ومتخلنيش أعدي منهم ... قاومني | ○ اعمل وضع الكتابة ... متخلنيش اعدي صباعي من صوابعك ... قاومني |

### 2. Wrist : كفك (يفضل الإختبار والأصابع مقفولة)

✌ Without resistance

| ○ Flexors (flexor carpi-radialis & ulnaris) اتني كفك | ○ Extensors (extensor carpi-radialis & ulnaris) افرد كفك |
|---|---|
| ✌ With resistance | إيدك اليمين تعمل resistance وإيدك الشمال تثبت ال elbow |
|  |  |
| ○ اتني كفك جامد .. زق عل إيدي | ○ افرد كفك جامد ... زق على إيدي ... |

## ○ Elbow: كوعك

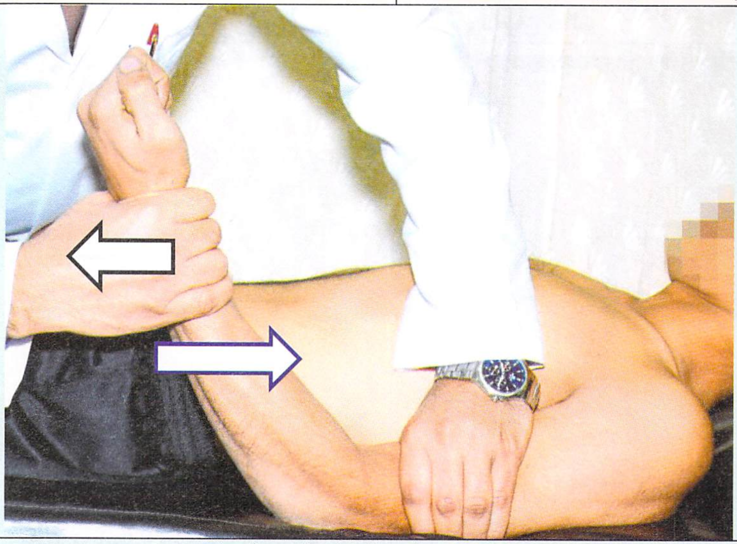
✌ Without resistance

○ Flexors (biceps, brachioradialis) اتني كوعك

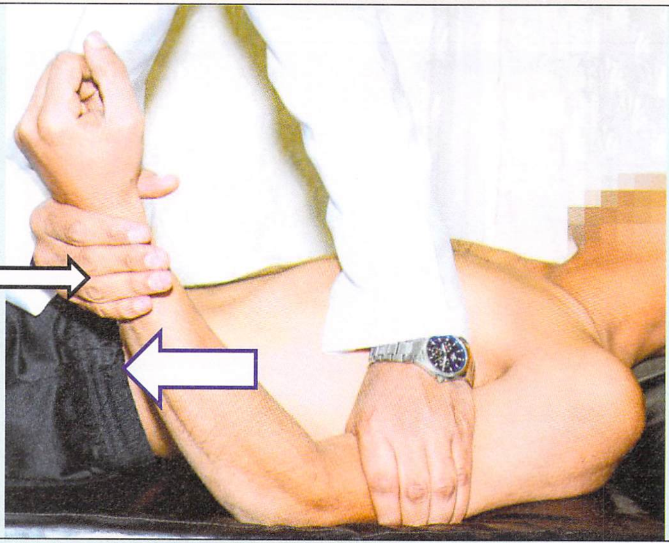
○ Extensors (triceps) افرد كوعك

✌ With resistance

إيد العيان في mid-position
إيدك اليمين حول ال forearm تعمل resistance من غير ما تغير وضعها وإيدك الشمال تثبت ال shoulder



○ اتني كوعك جامد... شد على ايدي



○ افرد كوعك جامد ... زق على ايدي

## 3. Shoulder دراعك : (يفضل الفحص والمريض جالس ← لازم تقولها للدكتور)

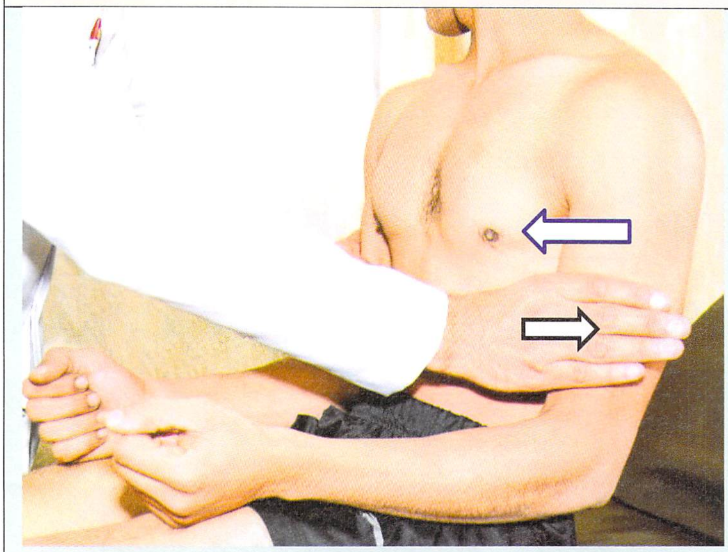
✌ Without resistance

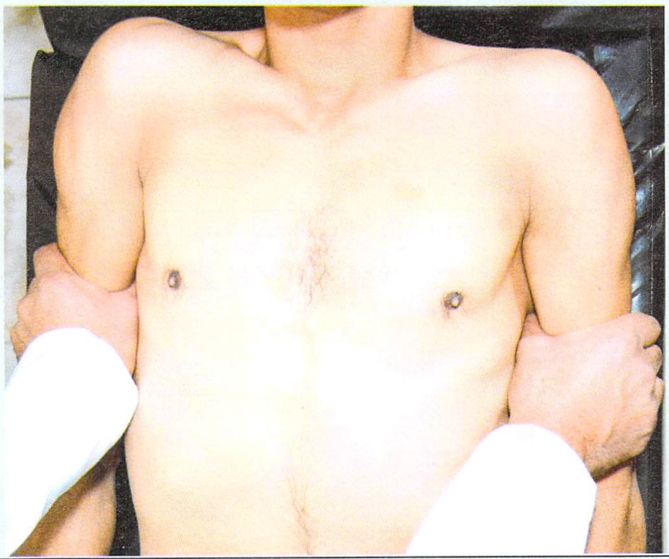
○ Flexors (anterior fibers of deltoid)
دراعك لقدام لو جالس أو لفوق لو نايم

○ Extensors (Posterior Fibers of deltoid)
دراعك لورا لو جالس أو لتحت لو نايم

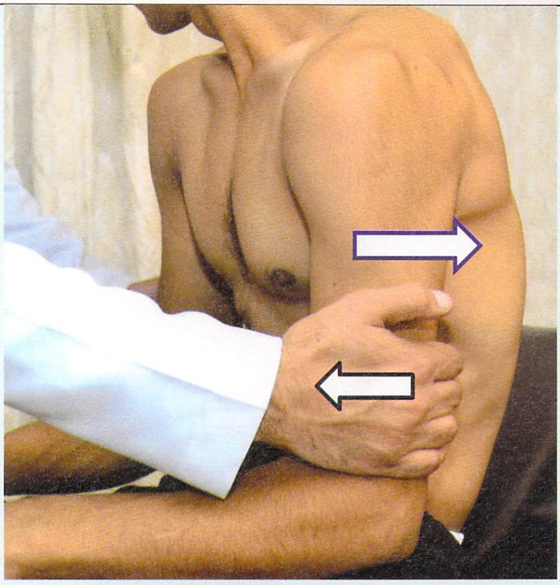
✌ With resistance

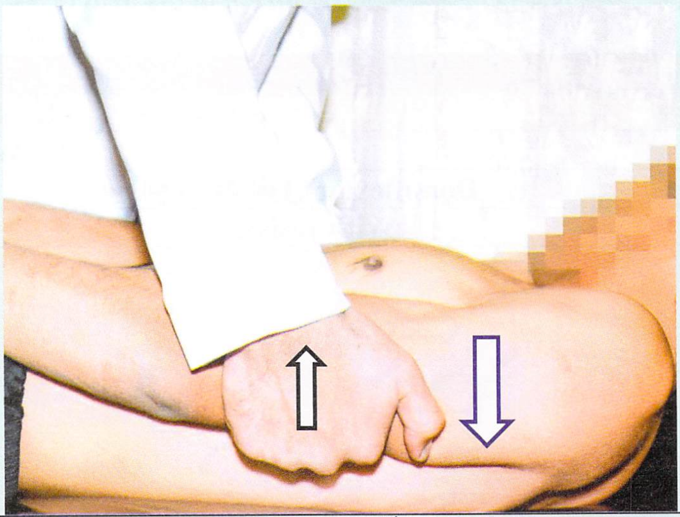
يتم فحص الدراعين معاً لأن مافيش مفصل تثبته
اعمل إيدك زي الكماشة حول ال arm علشان تعمل resistance وتقول للدكتور ويفضل والعيان جالس



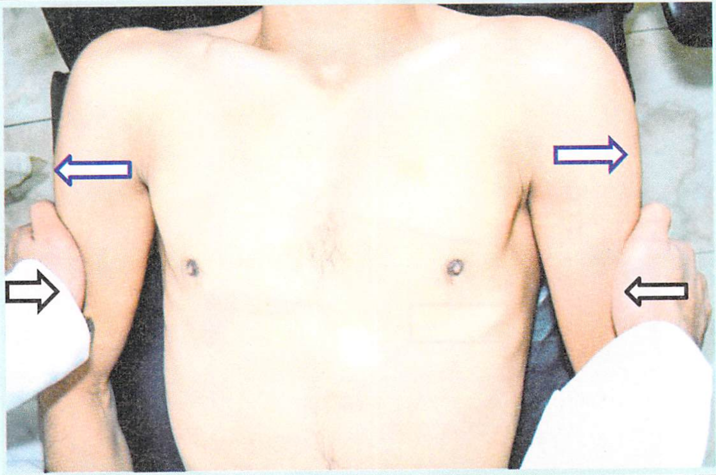
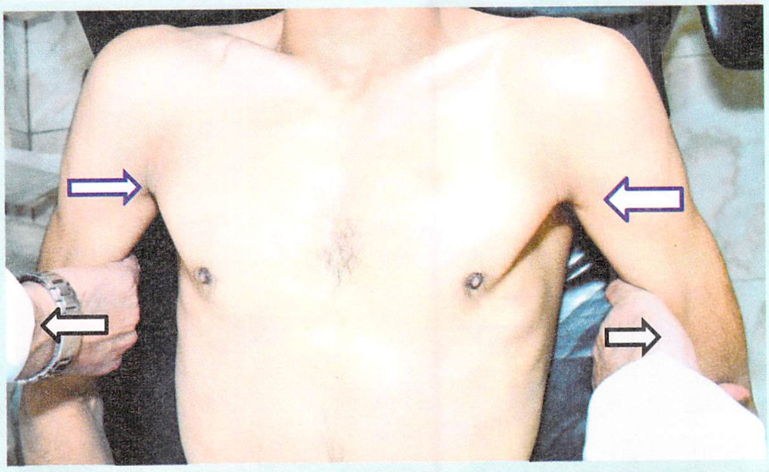
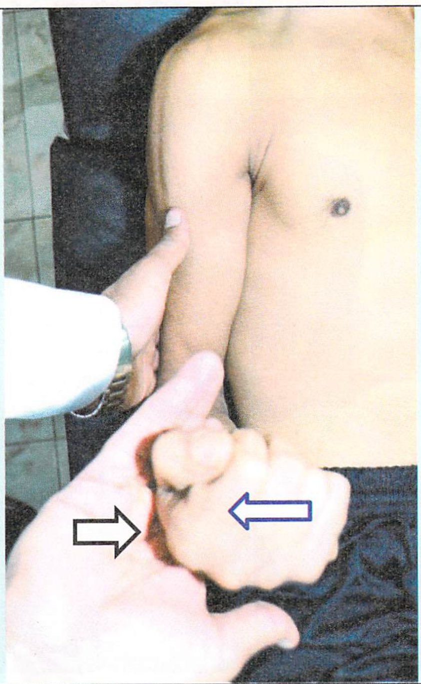
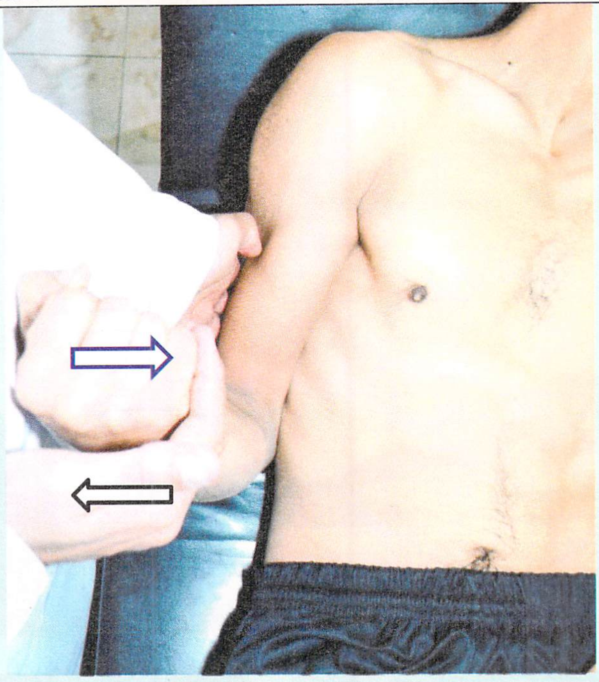


○ زق دراعك لقدام لو جالس (أو لفوق لو نايم) جامد ... متخلنيش أنزلهم ... قاومني



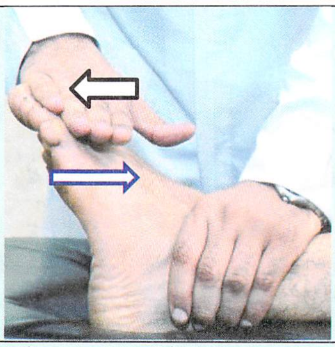
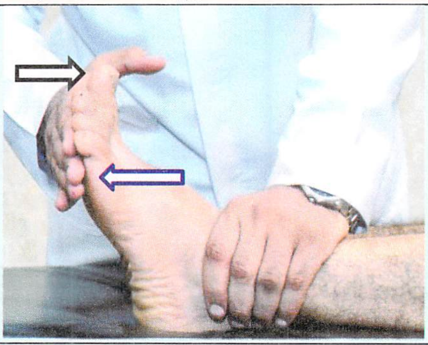


○ زق دراعك لورا لو جالس (أو لتحت لو نايم) جامد... متخلنيش أرفعهم ... قاومني

| | |
|---|---|
| ✌ **Without resistance** | |
| ○ **Abductors (supraspinatus, deltoid , trapezius) جنح** | ○ **Adductors (pectoralis major, pectoralis minor assisted by latissmus dorsi & teres major) ضم** |
| ✌ **With resistance** | ○ يتم فحص الدراعين معاً لأن مافيش مفصل تثبته<br>اعمل إيدك زي الكماشة حول ال arm علشان تعمل resistance من غير ما تغير الوضع وتقول للدكتور ويفضل والعيان جالس |
|  |  |
| ○ جنح دراعك لبره جامد ... زق ايدي لبره | ○ ضم دراعك لجوه جامد ... زق ايدي لجوه |
| ✌ **Without resistance** | |
| ○ **External rotation:** سرح شعرك | ○ **Internal rotation:**<br>حط إيدك في جيبك أو بايدك اليمين المس جيبك الشمال والعكس صحيح. |
| ✌ **With resistance** | |
|  |  |
| ○ ضع ال arm وال forearm في زاوية قائمة: زق ايدي اليمين لبره جامد | ○ ضع ال arm وال forearm في زاوية قائمة: زق ايدي اليمين لجوه جامد |

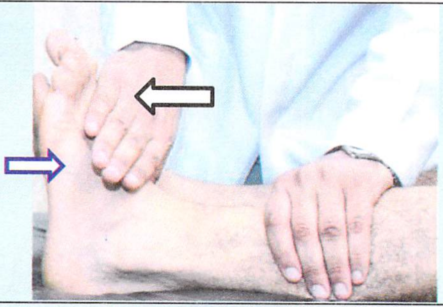
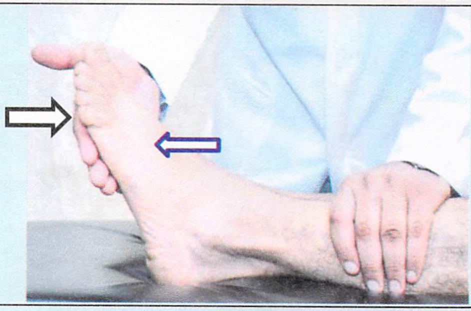
## II. Lower limbs

### 1. Toes :صوابع رجليك

| | |
|---|---|
| ✌ **Without resistance** | |
| ○ **Dorsiflexion** صوابع رجليك لفوق | ○ **Planter flexion** صوابع رجليك لتحت |
| ✌ **With resistance** | إيدك اليمين تعمل resistance وإيدك الشمال تثبت ال ankle |
|  |  |
| ○ ارفع صوابع رجليك لفوق جامد ... شد على ايدي | ○ نزل صوابع رجليك لتحت جامد ... زق على ايدي |

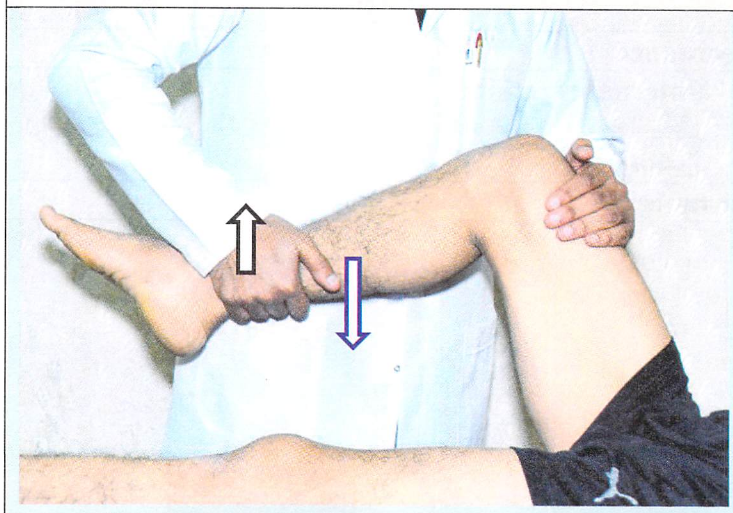
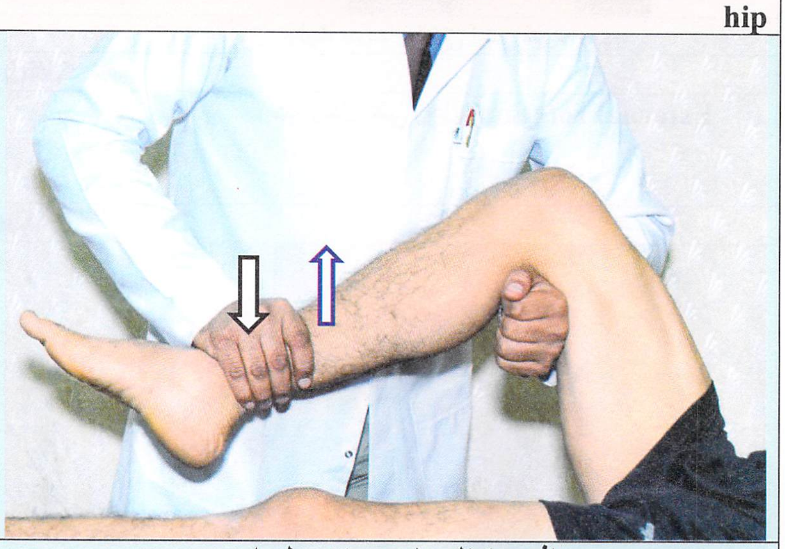
## 2. Ankle : وش رجلك

✌ Without resistance

| | |
|---|---|
| Dorsiflexion (anterior tibial muscles : tibialis anterior, peroneus longus, brevis) وش رجلك لفوق | Planter flexion (calf muscles; gastrocnemius, soleus, plantaris) وش رجلك لتحت |
| ✌ With resistance | إيدك اليمين تعمل resistance وإيدك الشمال تثبت ال knee |
|  |  |
| ○ ارفع وش رجليك لفوق جامد ... شد على ايدي | ○ نزل وش رجليك لتحت جامد ... زق على ايدي |

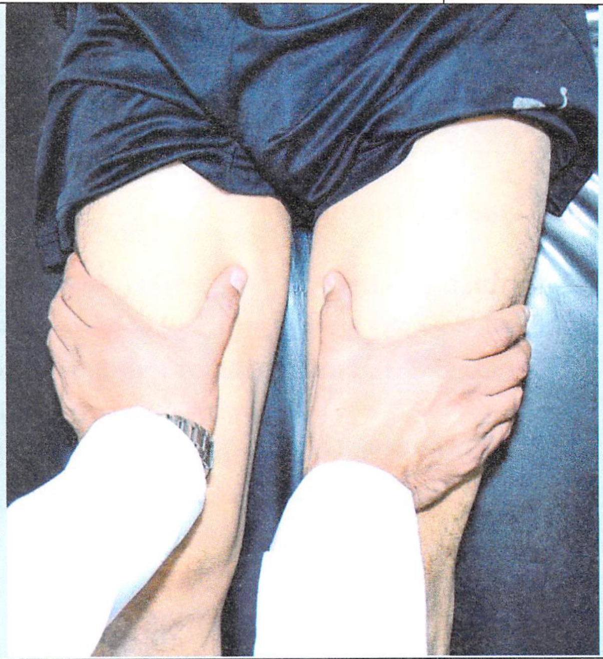
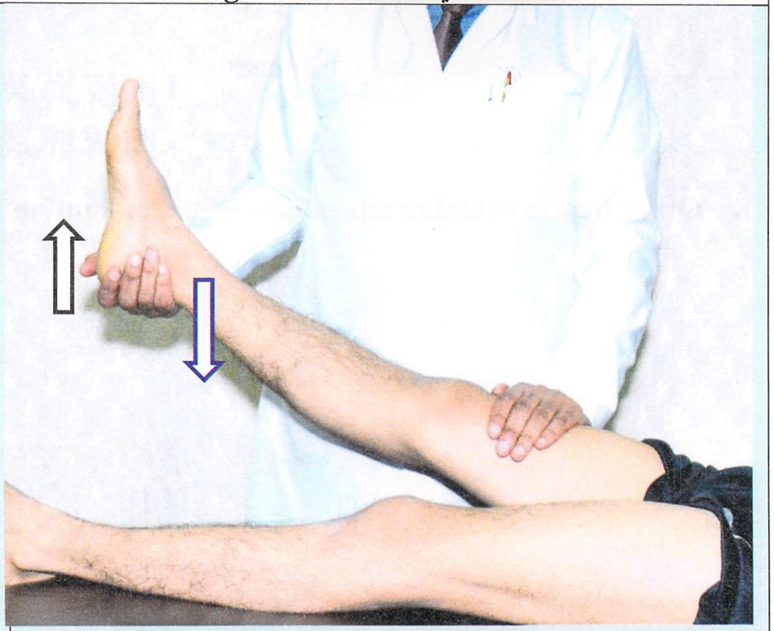
## 3. Knee ركبتك

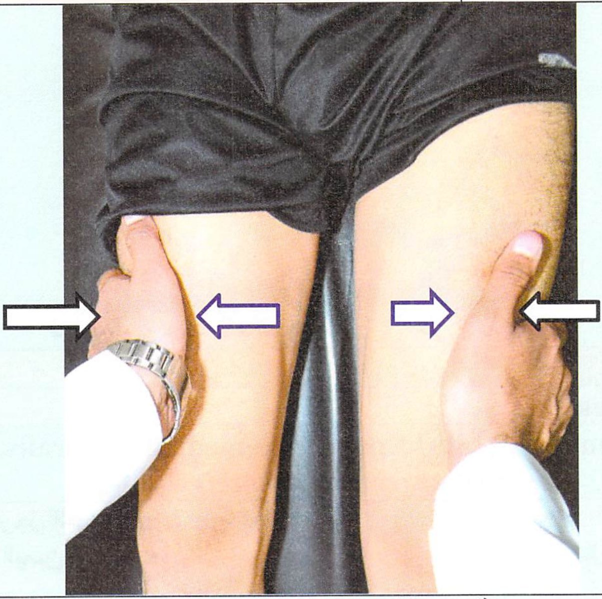
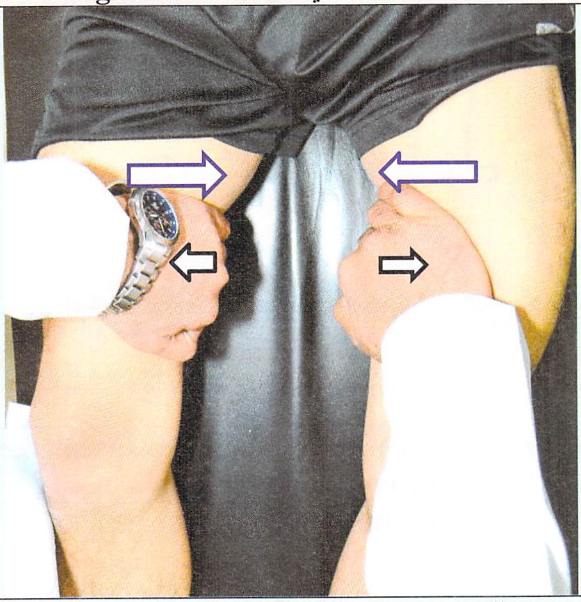
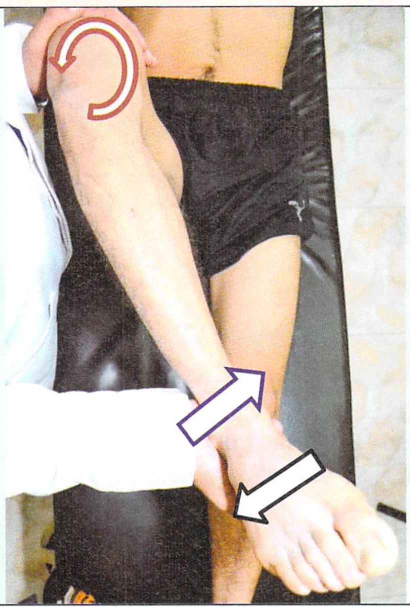
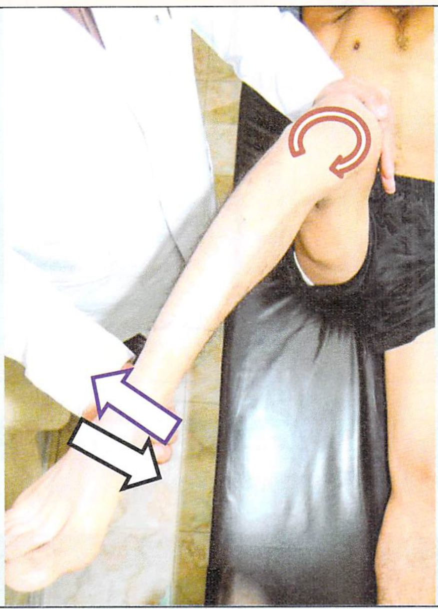
✌ Without resistance

| | |
|---|---|
| Flexors (hamstrings: semi-tendonosus, membranosus, biceps femoris) اتني ركبتك عليك | Extensors (quadriceps; vastus medialis, lateralis, intermedius, rectus femoris) افرد ركبتك |
| ✌ With resistance | خلي رجل العيان mid-position<br>إيدك اليمين كماشة حول ال leg تعمل resistance وإيدك الشمال تثبت ال hip |
|  |  |
| اتني ركبتك عليك جامد ... شد على ايدي | افرد ركبتك جامد ... زق على ايدي |

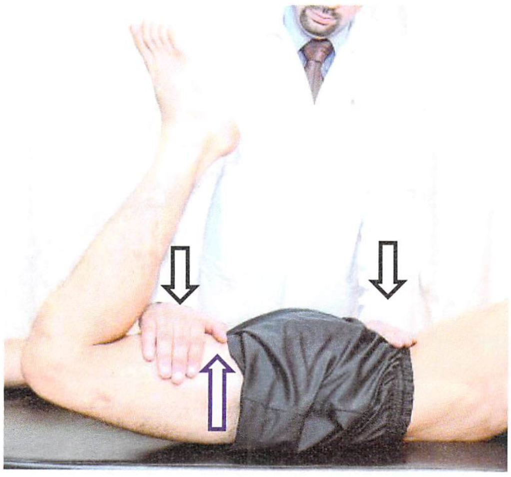
## 4. Hip : رجلك

✌ Without resistance

| | |
|---|---|
| ○ Flexors (ileo-psoas) ارفع رجلك | ○ Extensors (gluteus maximus) نزل رجلك |
| ✌ With resistance | يتم فحص الرجلين معاً لأن مافيش مفصل تثبته<br>اعمل إيدك زي الكماشة حول ال thigh علشان تعمل resistance |
|  |  |
| ○ ارفع رجلك لفوق جامد ... زق ايدي لفوق | ○ نزل رجلك لتحت جامد ... زق ايدي لتحت<br>○ لها طريقة أخرى هتتشرح بعد قليل والعيان نايم Prone |

<table>
<tr><td colspan="2">✌ **Without resistance**</td></tr>
<tr><td>○ **Abductors (gluteus medius, minimus) ابعد – افتح رجلك**</td><td>○ **Adductors (adductor group; adductor magnus, longus, brevis, pectineus, gracilis) ضم رجلك**</td></tr>
<tr><td>✌ **With resistance**</td><td>**يتم فحص الرجلين معاً لأن مافيش مفصل تثبته**<br>**اعمل إيدك زي الكماشة حول ال thigh علشان تعمل resistance**</td></tr>
<tr><td></td><td></td></tr>
<tr><td>○ **افتح رجليك جامد ... زق ايدي لبره**</td><td>○ **ضم رجلك جامد ... زق ايدي لجوه**</td></tr>
<tr><td colspan="2">✌ **Without resistance**</td></tr>
<tr><td>○ **External rotation: حط رجل على رجل**</td><td>○ **Internal rotation:**<br>**والعيان قاعد على الكرسي قوله المس بركبتك اليمين الركبة الشمال والعكس**</td></tr>
<tr><td colspan="2">✌ **With resistance**</td></tr>
<tr><td></td><td></td></tr>
<tr><td>○ **ضع ال thigh وال leg في زاوية قائمة:**<br>**زق ايدي اليمين لجوه جامد**</td><td>○ **ضع ال thigh وال leg في زاوية قائمة:**<br>**زق ايدي اليمين لبره جامد**</td></tr>
</table>

❖ **Other way to examine hip extension = examination of power in gluteus maximums :**



**أ) العيان ينام على وشه ... ليه ؟؟؟ ← against gravity**

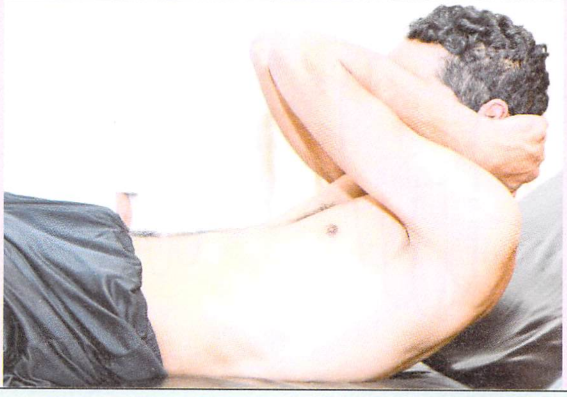
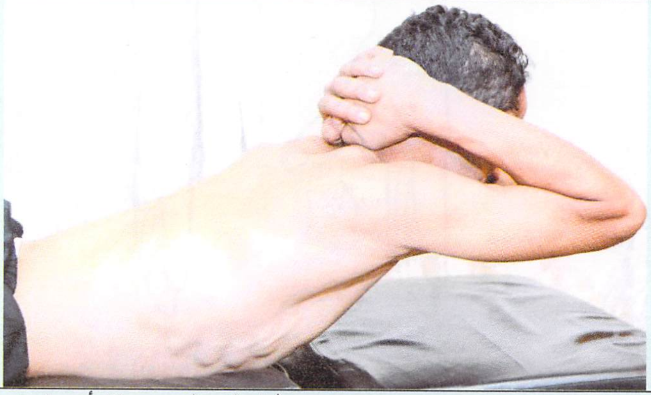
**ب) الدكتور يضع ايده اسفل العمود الفقري ويدوس .... ليه ؟؟؟**

**To avoid action of trunk muscles**

**ت) خلي العيان يتني ركبته ... ليه ؟؟؟**

**To put the hamstring muscles out of work**

**ث) اقول للعيان ارفع رجلك لفوق ومتخلنيش أنزلها ... قاومني**

| III. Abdominal muscles : | |
|---|---|
| Without resistance | |
| **Flexors** | **Extensors** |
| العيان يربع إيده أو يحطها تحت راسه وقوله هم براسك | العيان يحط إيده ورا راسه وقوله قوم طياره |
|  |  |
| With resistance → حط إيدك على جبهته أو راسه من ورا وتقوله هم | |

← بص على ال Umbilicus :

❖ الإحتمالات:

1) العضلات اللي فوق وتحت شغالين كويس , أو مش شغالين كويس : ← umbilicus is central

2) العضلات اللي تحت هي بس اللي شغالة واللي فوق مش شغالة ← umbilicus is shifted downwards

3) العضلات اللي فوق هي بس اللي شغالة واللي تحت مش شغالة ← umbilicus is shifted upwards (Beevor's sign)

**❖ Beevor's sign:**

- **Definition :** spared upper fibers of rectus abdominis while lower fibers are paralyzed
- **Causes:** some cases of myopathy (pelvic girdle type)
- **Significance :** leveling sign: paraplegia at the level of T10

**❖ Value of power examination :**

1) **Power grading**
2) **Distribution** e.g. pyramidal tract lesion:

↳ In hemiplegia:

❖ Distal weaker than proximal & Abductors weaker than adductors in UL & LL.

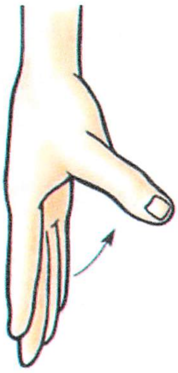
❖ Extensors weaker than flexors in UL & Flexors weaker than extensors in LL

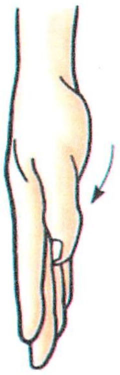
**❖ N.B.: Types of muscles :**

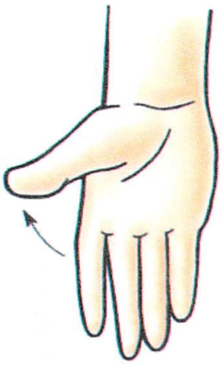
| A. Antigravity muscles (Pull UP) | B. Progravity muscles (Pull Down) |
|---|---|
| Upper limbs | |
| Flexors, adductors | Extensors, abductors |
| Lower limbs | |
| Extensors, adductors | Flexors, abductors |
| Trunk | |
| Extensors | Flexors |

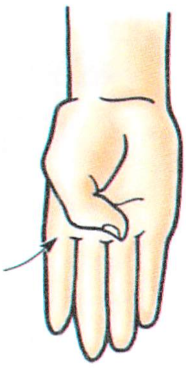
### ❖ How to test muscles of thumb? سؤال مستقل لوحدة في لجنة العملي

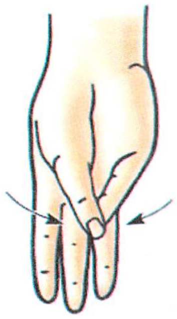
1. **Without resistance :** إدي العيان الأمر وأنت بتمثل الحركة قدامه


Abduction


Adduction

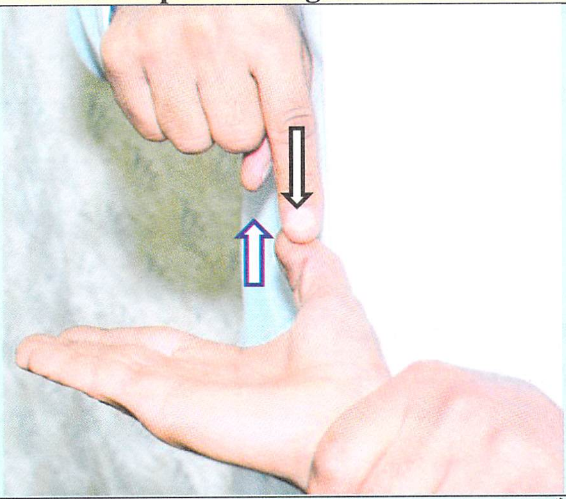
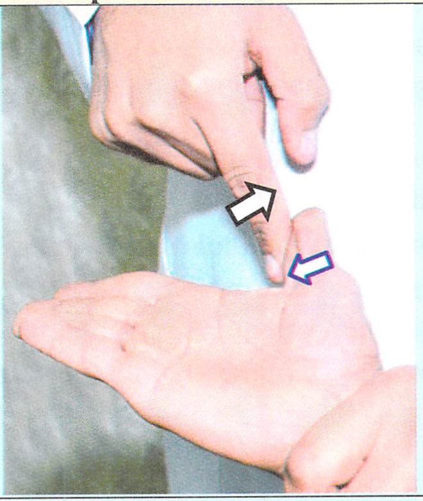
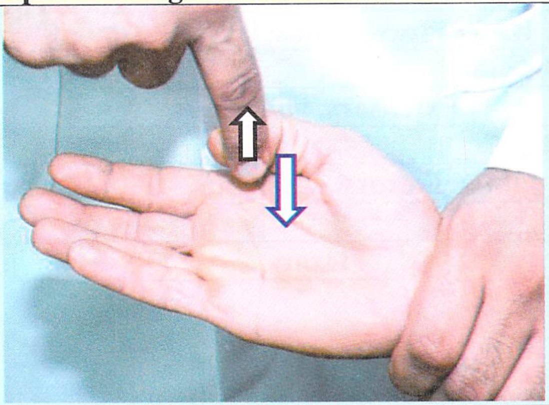
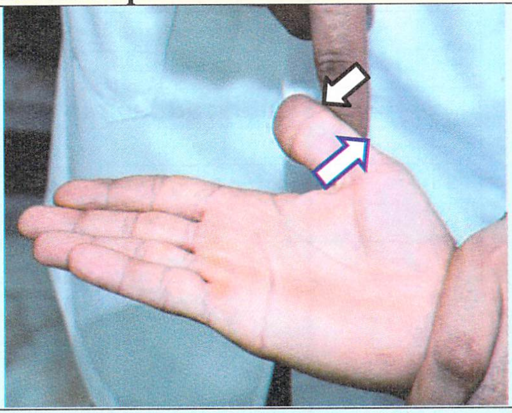

Extension


Flexion


Opposition

2. **With resistance :**

- ايديك اليمين تعمل **resistance** وايديك الشمال تثبت ال **wrist**

<table>
<tr><th colspan="2">Muscles & action:</th></tr>
<tr><td colspan="2"><b>1) Opponens policies → opposition (see before)</b></td></tr>
<tr><td colspan="2">○ اعمل حلقة بصباعك الصغير على الكبير ومتخلنيش أعدي منهم ... قاومني</td></tr>
<tr><td><b>2) Abductor pollicis longus → abduction</b></td><td><b>3) Adductor pollicis → adduction</b></td></tr>
<tr><td></td><td></td></tr>
<tr><td>○ المقاومة تكون على جانبي ال <b>thumb</b><br>○ ارفع صباعك لفوق جامد ... ومتخلنيش أنزله ... قاومني</td><td>○ المقاومة تكون على جانبي ال <b>thumb</b><br>○ ضم صباعك لجوه جامد ... ومتخلنيش ابعده ... قاومني</td></tr>
<tr><td><b>4) Flexor pollicis longus → flexion</b></td><td><b>5) Extensor pollicis brevis → extension</b></td></tr>
<tr><td></td><td></td></tr>
<tr><td>○ المقاومة تكون من الأمام <b>against distal phalanx</b><br>○ اتني صباعك جامد ... متخلنيش افرده ... قاومني</td><td>○ المقاومة تكون من الخلف <b>against inter-phalangeal joint</b><br>○ افرد صباعك جامد ... متخلنيش اتنيه ... قاومني</td></tr>
</table>

❖ **N.B.: abduction movement :**

| | |
|---|---|
| ▪ **From 0-15°** | ▪ **Supra-spinatus** |
| ▪ **15-90°** | ▪ **Deltoid** |
| ▪ **90-180°** | ▪ **Trapezius** |

## 1. Co-ordination:

❖ لازم تختبرها بعد ال power ... ليه ؟

- لأنه يمنع الحكم عليها تماماً في وجود ال motor weakness
  - ○ Deep sensation → مسئول عنه وهو مغمض
  - ○ Cerebellum → مسئول عنه في كل الظروف

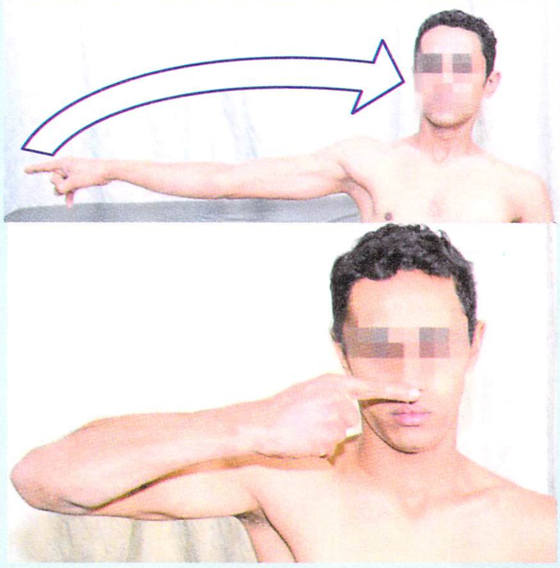
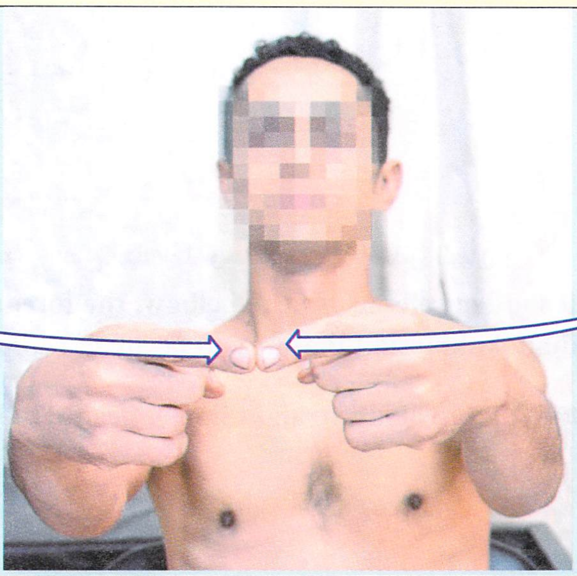
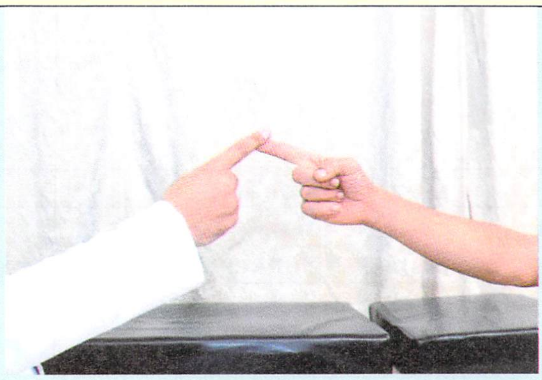
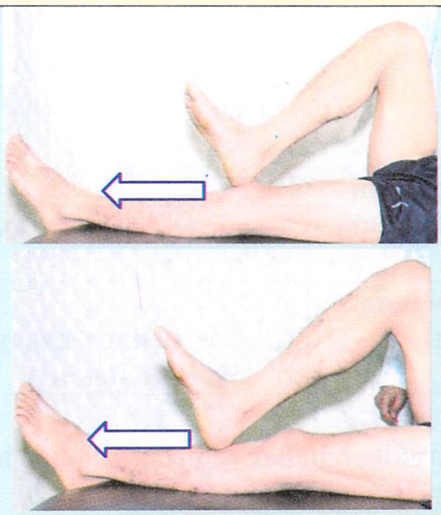
**Test for coordination not done in limb showing paralysis:**

| | |
|---|---|
| ○ Hemiplegia : examined in healthy side only | ○ Paraplegia : upper limbs only |

**Every test should be repeated 2 times** اعملهم مرة وهو مفتح ومرة وهو مغمض:

| | |
|---|---|
| ○ Eye open to examine the cerebellum | ○ Eye closed to examine deep sensation |

❖ **Technique :** اتكلم له وشاور فهمه

| | |
|---|---|
| **A. Finger - to nose test:**<br>وأنت مفتح هات صباعك من بعيد على مناخيرك (يعاد وهو مغمض) | **B. Finger - to finger test:**<br>وأنت مفتح هات صباعينك الإتنين من بعيد على بعض (يعاد وهو مغمض) |
|  |  |
| **C. Finger - to fixed doctor's finger test:**<br>وأنت مفتح هات صباعك من بعيد على صباعي | **D. In LL: Heel - to knee test:**<br>وأنت مفتح هات كعبك على ركبتك ومشيه على قصبة رجلك (يعاد وهو مغمض) |
|  |  |

❖ **Result of examination; incoordination:**

1. **In UL:**

a) Intention Kinetic tremors which become more evident as the patient's forefinger approaches the target

b) Decomposition of movement

c) Dysmetria in the form of hypermetria or hypometria

2. **In LL:**

- As above + side to side movement

## ❖ Interpretation of results :

| | Normal | Pure sensory ataxia | Pure cerebellar ataxia | Mixed ataxia e.g. Fridrecih's ataxia |
|---|---|---|---|---|
| Eye opened | -ve | -ve | +ve | +ve |
| Eye closed | -ve | +ve | +ve (the same) | More +ve |

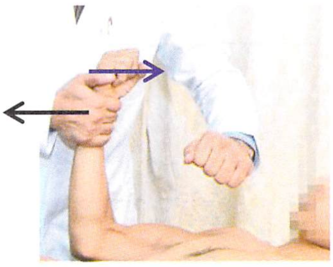
## ❖ Confirmatory test for each type of ataxia :

### I. Cerebellar ataxia: Signs of incoordination : when eye both opened & closed:

1) **Eye :** nystagmus, character of cerebellar nystagmus

| | | | | |
|---|---|---|---|---|
| ○ On fixation | ○ Horizontal | ○ Biphasic (jerky) | ○ Rapid phase towards the fixation point | ○ Bilateral |

2) **Tongue:** staccato speech
3) **Neck:** nodding
4) **Trunk:** titubation
5) **Buttoning and unbuttoning test:** failure is the earliest sign
6) **Rebound phenomenon : Holme's sign :**



- وش العيان الناحية التانية ... إخلع الساعة من إيدك ... لو العيان لابس نضارة يقلعها ... ضع إيدك أمام وجه العيان ... إفحص العيان :
- With sudden release of flexed elbow, the forearm may hit patient face

7) **Dysdiadokokinesia :** inability to perform rapid alternating movement e.g. pronation & supination

8) **Gait:** Walking along straight line, " heal to toe gait" "Tandem Gait" :
   - ○ إشمعنى المشية ديه ؟ لأنها تحتاج very high co-ordination

| Cerebellar lesion | Disease | Gait disturbance |
|---|---|---|
| A. Archicerebellum: | Friedriech's ataxia | ○ Standing : swaying (trunkal ataxia)<br>○ Walking : Wide base "drunken" or staggering gait |
| B. Neocerebellum:<br>○ Unilateral<br>○ Bilateral | ○ Cerebellar astrocytoma<br>○ Marie's ataxia | ○ Deviation to one side<br>○ Zigzag gait |

9) In both archicerebellar & neocerebellar lesions leads to :

- Hypotonia & hyporeflexia
- Pendulous Knee jerk

### II. Sensory ataxia: Signs of incoordination :when eye closed only

1) **Washbasin sign :** is a fixed complaint of all patient , leading to swinging on washing face.
2) **Rombergism :** +ve Romberg's sign (see later)
3) **Deep sensory loss:** loss of vibration sense, position of movement, muscle sense & nerve sense.
4) **Reflex:** Hypotonia & hyporeflexia
5) **Stamping gait:** heavy strike of ground on walking due to lost deep sensation of ground

# 1. Reflexes

## ❖ Types of reflexes :

| | | |
|---|---|---|
| 1. Deep | 2. Pathological | 3. Superficial |

## ❖ قواعد فحص ال reflex :

1. لازم تعري العضلة وعينك عليها
2. خلي العضلة slightly stretched
3. بعض ال reflexes تحتاج stretch أكتر وده عن طريق الضغط بصباعك على ال tendon ناحية اليمين بال index وناحية الشمال بال thumb
4. لازم العيان ميكونش tension ← قوله سيب نفسك خالص
5. دائماً قارن بين الناحيتين بنظام وأبدأ من الناحية السليمة
6. في حالات ال hyper-reflexia فقط ← إبحث عن ال Clonus & Pathological reflexes
7. ال Clonus & Pathological reflexes تتعمل في الناحية ال diseased only ومتتعملش في الناحية ال normal
8. كل ال pathological reflexes بنستخدم فيها صباعنا ماعدا ال supra-spinatus
9. لو الدكتور قالك اعمل ال reflex الفلاني لازم تقول ال center
10. أثناء الفحص لو reflex ما ظهرش اعمل Reinforcement : Jandrassik's maneuver

→ Reinforcement : Jandrassik's maneuver:

A. If the reflex is in the UL ➔ جز على سنانك جامد

B. If the reflex is in LL ➔ جز على سنانك جامد وشبك وشد إيديك كده

- Mechanism of reinforcement: ↑ discharge in gamma fibers which supply reflex
- Result :

A. If still negative after reinforcement ➔ areflexia

B. If become positive after reinforcement ➔ hyporeflexia i.e. hyporeflexia is a reflex only obtainable after reinforcement

## ❖ Center of reflexes (root value):

| ❖ Center: | ❖ Reflex: |
|---|---|
| C3-4 | Supraspinatus |
| C5 | Deltoid |
| C5 – T1 | Pectoral |
| C5-6 | Biceps – Brachioradialis |
| C6-7 | Triceps |
| C8 – T1 | Wrist clonus<br>Finger flexion<br>Hoffman<br>Wetenberg |
| T6-T12<br>Upper : T6-T8<br>Middle : T8-T10<br>Lower: T10-T12 | Abdominal |
| L1 | Cremastric |
| L2-3-4 | Tendon Knee jerk, Patellar, patellar clonus |
| L4 | Adductor |
| L4-5 | Gluteal |
| S1, S2 mainly S1 | Ankle, Ankle clonus & Planter (Babinski) |
| S3,4,5 | Anal |

## ❖ Grades of deep reflexes:

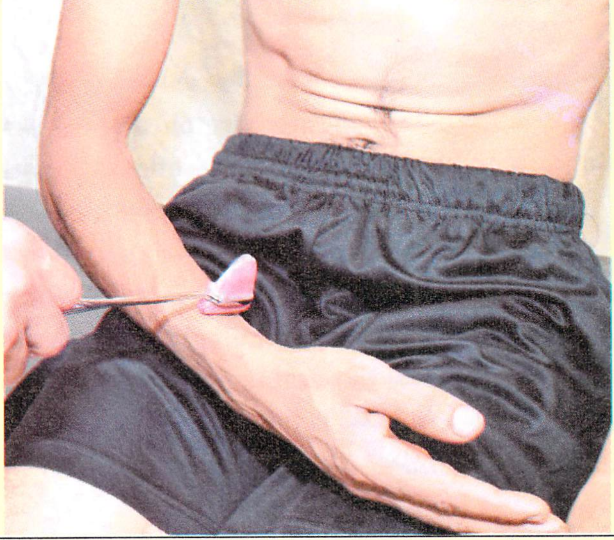
| Grade of : | Reflexes |
|---|---|
| 0 | Areflexia |
| 1 | Hyporeflexia (0/1) |
| 2 | Normal |
| 3 | Hyperrreflexia |
| 4 | Clonus |

**❖ Technique** : see below

## I. Upper limbs :

### Normal Deep reflexes :

**1) Brachioradilis reflex or Supinator reflex: (C5-6)**



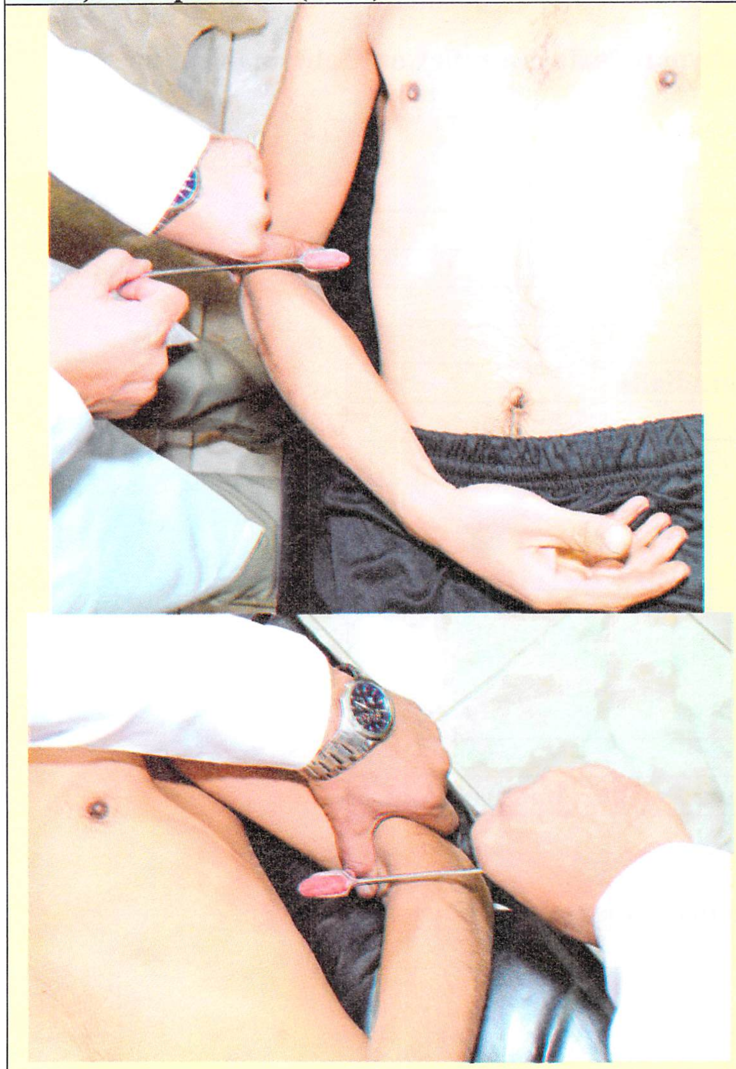
- الكوع في زاوية 120°
- ايد العيان mid-way between supination & pronation
- اخبط بالناحية العريضة على 1 inch above radial styloid process

**What is inverted supinator reflex?**

- **Causes :** lesion at C5 segment & root
- **Components :**

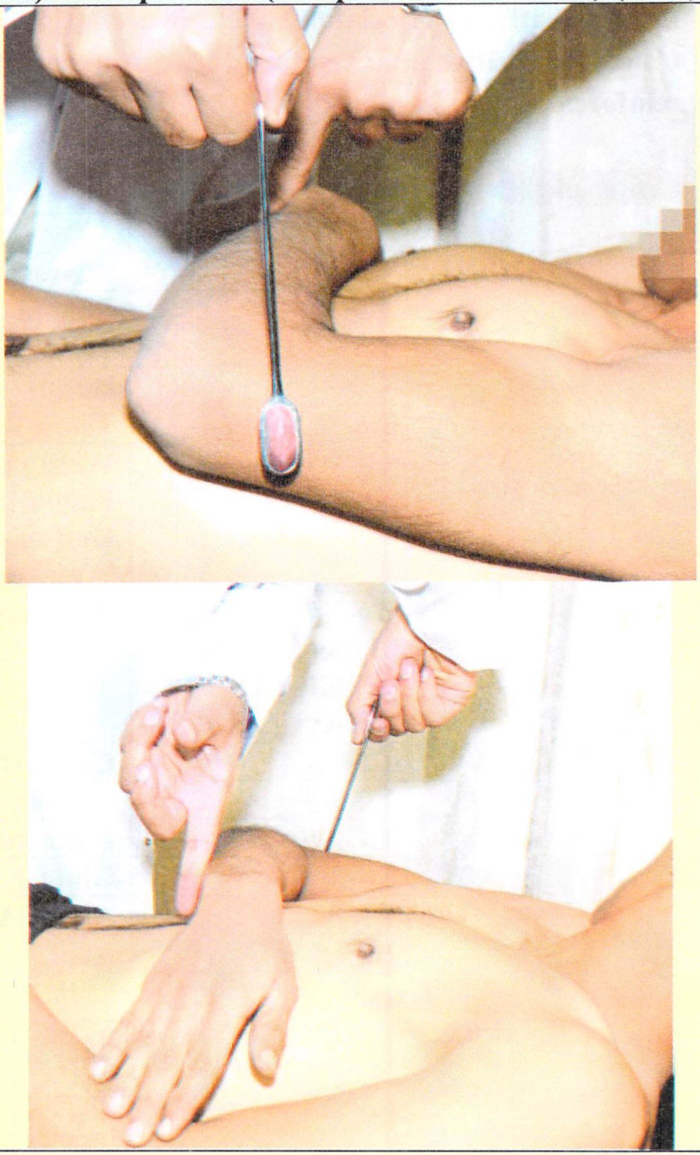
1. Lost biceps reflex
2. Exaggerated triceps reflex
3. Inverted supinator reflex (flexion of fingers instead of flexion of elbow)

**2) Biceps reflex (C5-6)**



- الكوع في زاوية 120°
- زود ال stretch بصباعك
- اخبط بالناحية المدببة وعينك على ال biceps

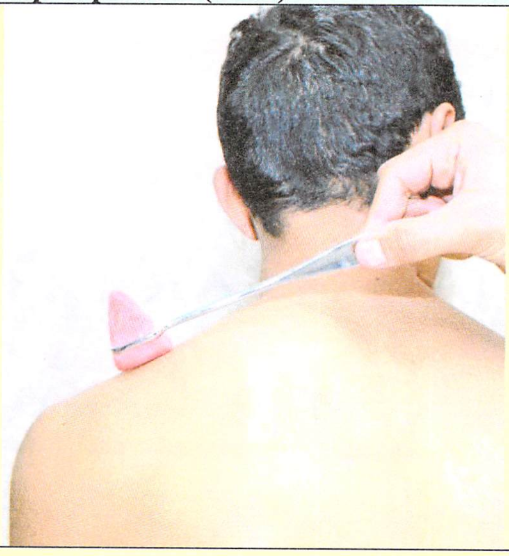
**3) Triceps reflex (triceps brachialis reflex) (C6-7)**



- الكوع في زاوية 90°
- ممكن تعمل more stretch بأنك تشد على إيد العيان
- اخبط بالناحية العريضة وعينك على ال triceps

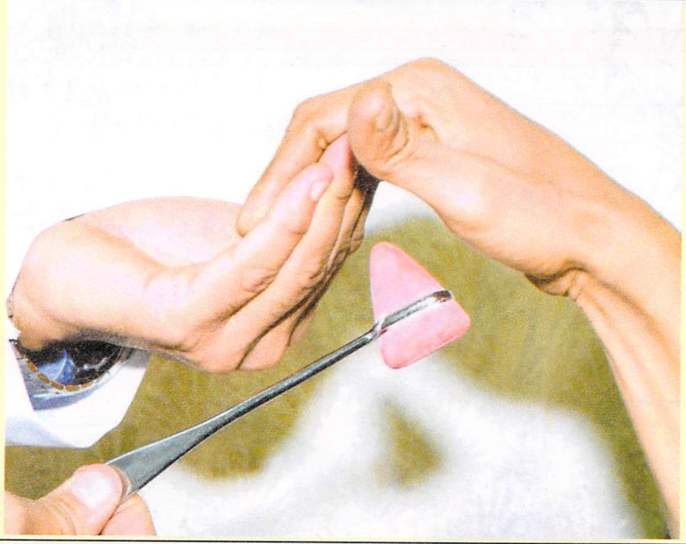
## Pathological reflexes normally absent , if present they denote UMNL, done only in hyperreflexia:

### 1) Supraspinatus (C3-4)



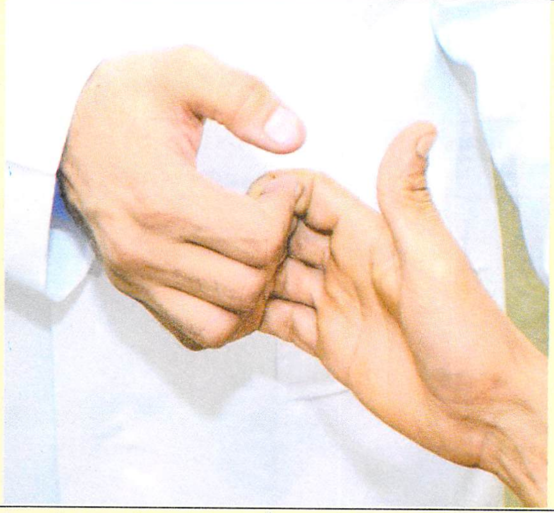
- العيان قاعد والكتف مكشوف
- حس ال spine of scapula واخبط فوقه

### 2) Finger flexion (C8 – T1)



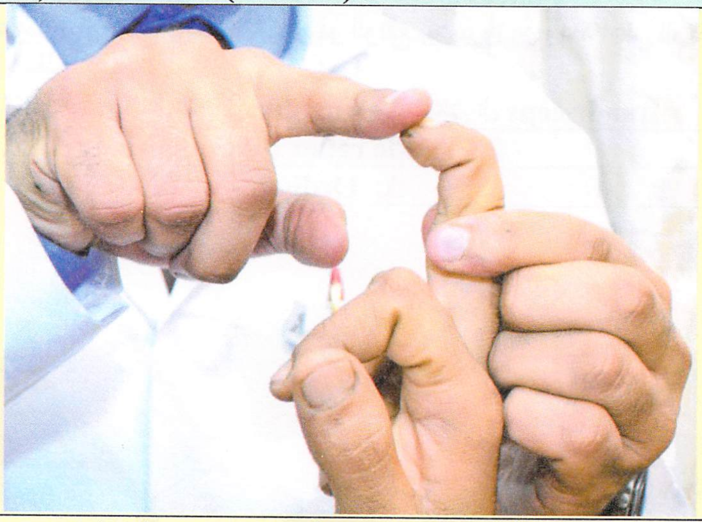
- اثني أصابع اليد بزاوية 90° وحط صوابعك ضد صوابعه كأنك هتبوس ايده
- اخبط على صوابعك من تحت
- لو +ve هيشد على صوابعك أو يقفل صوابعه

### 3) Wetenberg (C8 – T1)



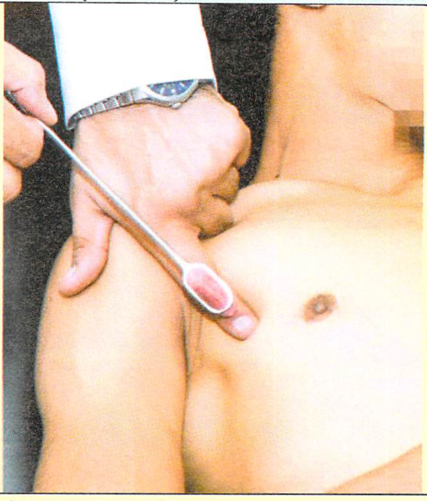
- شد صوابعك من صوابع العيان بتاعة نفس اليد (اليمين باليمين والشمال بالشمال)
- انته شد وهو يشد
- لو طبيعي ← extension of the thumb, abduction
- لو hyper-reflexia ← flexion of thumb, adduction

### 4) Hoffman's (C8 – T1)



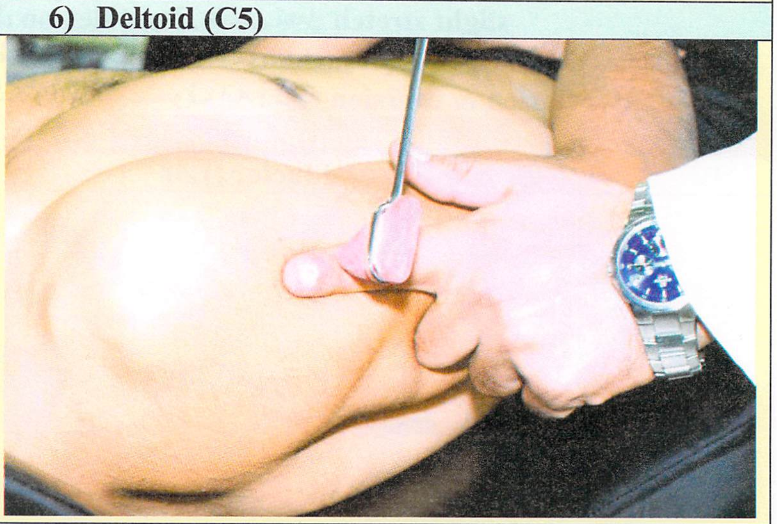
- امسك الصباع الأوسط بتاع العيان وثبت ال PIPJ واثني ال DIPJ وسيبها فجأة كأنك بتطرقعها
- لو +ve صوابع العيان تتقفل وخصوصا يحصل Flexion of thumb

### 5) Pectoral (C5-T1)



- حط صباعك على ال anterior axillary fold واخبط فوقه

### 6) Deltoid (C5)



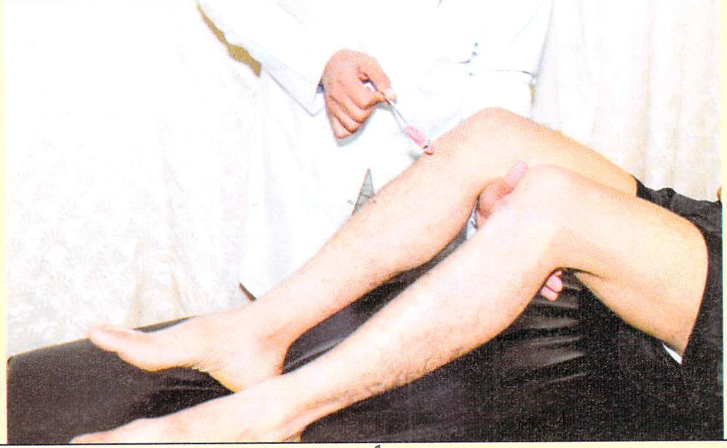
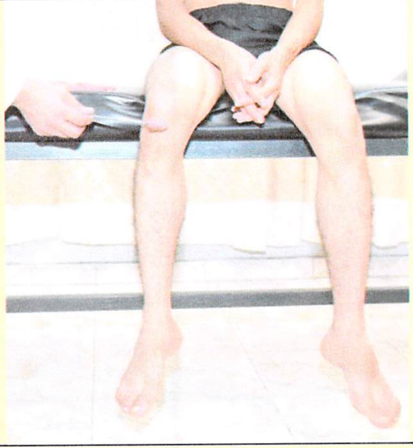
- حط صباعك على ال deltoid واخبط فوقه

**Search for clonus only in hyperreflexia : WRIST CLONUS, Organic sustained clonus is the surest sign of UMNL : see later.**

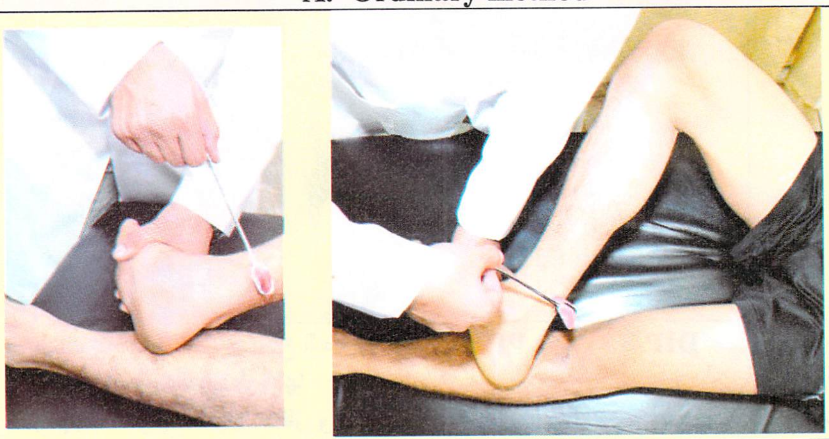
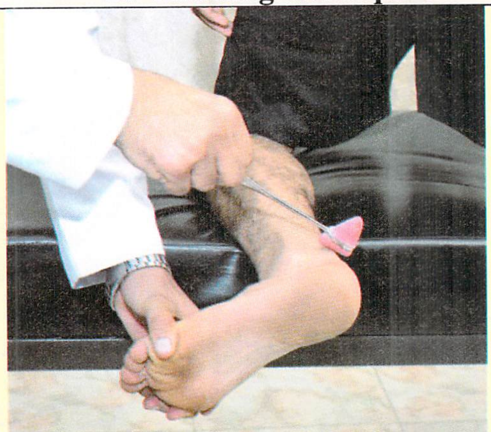
## II. Lower Limbs:

### Normal Deep reflexes :

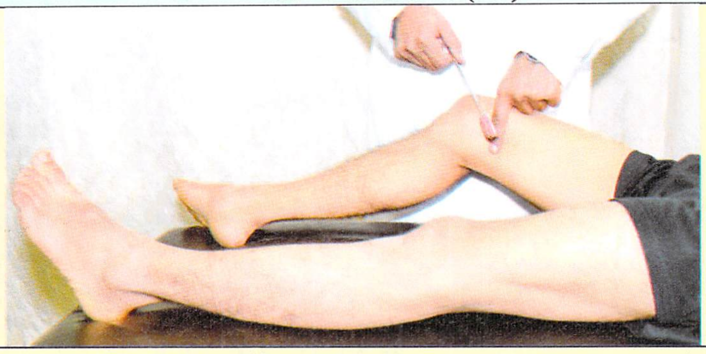
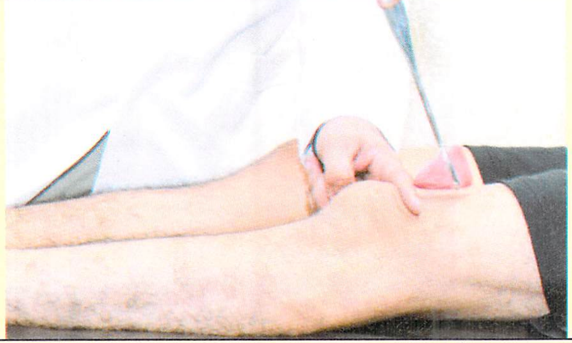
#### 1. Tendon Knee jerk (quadriceps reflex) (L2,3,4)

| A. Ordinary method | B. Dangling (hanging) technique : |
|---|---|
|  |  |
| • اتني الرجل 120° على الناحيتين معاً<br>• ارفع الرجلين مع بعض من تحت الركبة بحيث تجعل كعبه يا دوب ملامس السرير<br>• حط ال thumb بتاع الايد اللي انت رافع بيها بين ال 2 knees<br>• ابحث عن ال tendon بايدك التانية و هو الواقع بين بروزين واحد أعلى الركبة والآخر أسفلها (هامة)<br>• اخبط بالناحية العريضة على ال tendon وعينك على ال quadriceps | • الرجل متدلية عاملة زاوية 90 °<br>• ابحث عن ال tendon بايدك وهو الواقع بين بروزين واحد أعلى الركبة والآخر أسفلها (هامة)<br>• اخبط بالناحية العريضة على ال tendon وعينك على ال quadriceps |

#### 2. Ankle reflex (triceps surae reflex, gastrocnemius soleus reflex) (S1, 2 mainly S1)

| A. Ordinary method | B. Kneeling technique : |
|---|---|
|  |  |
| • اتني الرجل 90° ليه؟ to abolish action of gastrocnemius on knee وخليه كأنه حاطط رجل على رجل وينيمها لبره<br>• اعمل dorsi-flexion علشان تعمل slight stretch<br>• اخبط بالناحية العريضة على tendo-achillis وعينك على ال calf muscles<br>• لو الدكتور سألك هتشوف ايه : قوله planter flexion & eversion | • العيان قاعد على حاجة مستواها عالي بحيث رجليه متكونش لامسة الارض مع نفس الخطوات السابقة |

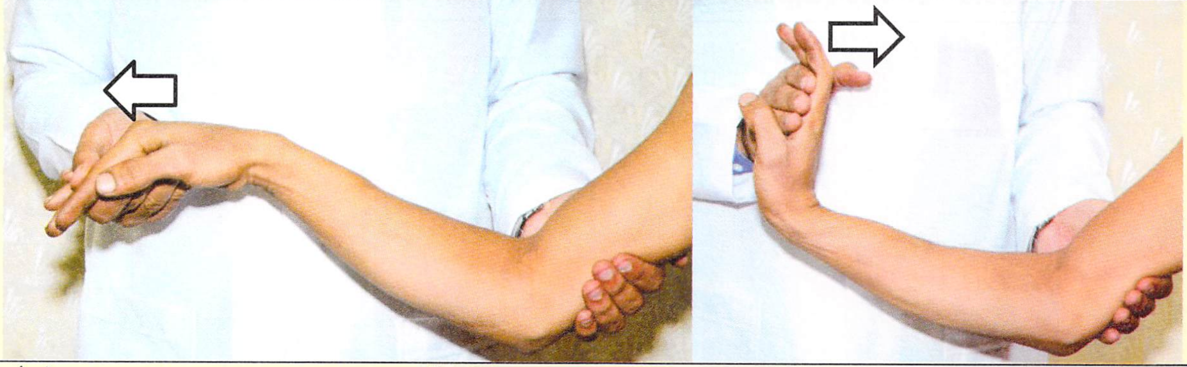
### Pathological reflexes normally absent , if present they denote UMNL, done only in hyperreflexia:

| 1. Adductor (L4) | 2. Patellar (quadriceps reflex) (L2,3,4) |
|---|---|
|  |  |
| • اعمل abduction و external rotation لل hip<br>• دور على ال tendon ده انك تطلع سنة فوق ال adductor tubercle واعمل rolling هاتحس كأن في حبل تحت ايدك<br>• دوس عليه بصباعك جامد علشان تزود ال stretch ثم اخبط<br>• لو hyper-reflexia ← adduction of thigh | • ركبة العيان مفرودة 180°<br>• حط your index بسيفه above patella واخبط عليه من أعلى لأسفل<br>• لو hyper-reflexia ← الركبة تنط لفوق |

## Clonus in Limbs:

**Search for clonus only in hyperreflexia : Organic sustained clonus is the surest sign of UMNL.**

### 1. Wrist clonus (C8-T1)



- اسند ال forearm بايدك الشمال من الكوع وامسك ايده باليمين وطلعها لقدام حاجه بسيطة وبعدين ارجع اعمل dorsiflexion فجأة

❖ **Types of clonus :**

1) **Sustained** على طول , **non-sustained** مرة أو مرتين
2) **Organic** عضوي , **hysterical** هستيري

→ **DD between organic & hysterical clonus :**

❖ تلغي ال stretch اللي أنته عامله بدون ما يشعر المريض

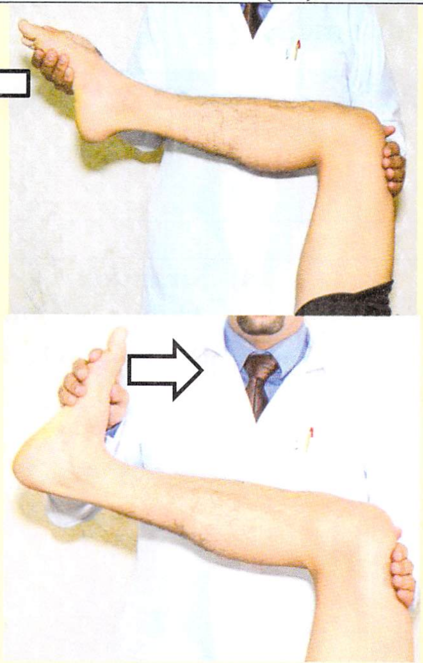
❖ لازم العيان يحس انك لسه حاطط إيدك وفي نفس الوقت شد الناحية العكسية

- لو استمر : يبقى hysterical
- لو اختفى يبقى organic

- **Organic sustained clonus is the surest sign of UMNL**

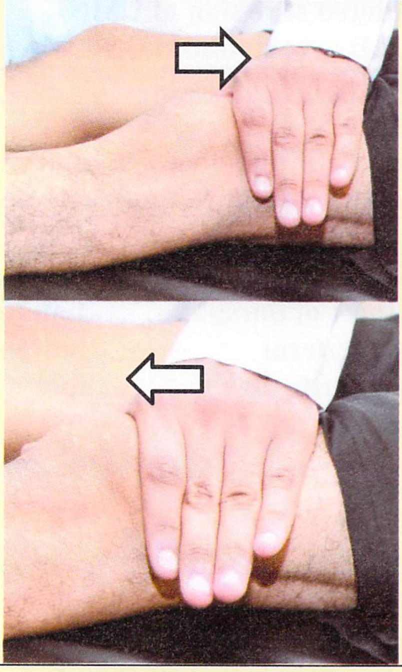
- كل clonus معاه UMNL وليس العكس

### 2. Ankle clonus (S1, 2 mainly S1)



- اتني رجله لقدام حاجه بسيطة وبعدين اعمل dorsiflexion فجأة
- تلاقي القدم بترقص فوق وتحت

### 3. Patellar clonus (L2,3,4)

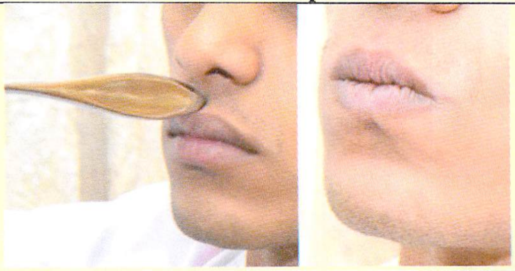


- وشك لرجل العيان
- خلي صوابعك مع بعض في مواجهة ال thumb زي الكماشة
- شد جلد الركبة لفوق شوية
- ثم زق الركبة لتحت هتلاقي الركبة بترقص طالعة نازلة

**N.B.: Other Pathological reflexes (normally absent) : in the face**

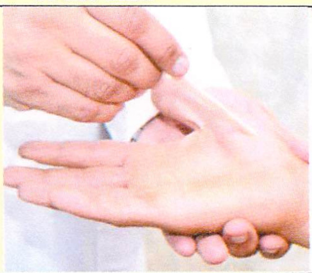
### 1. Pouting or snout

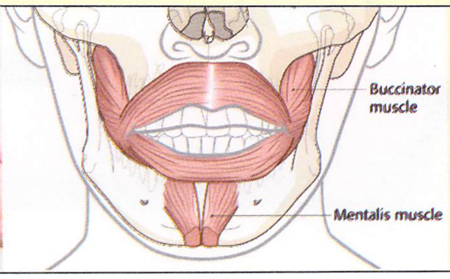
○ Light tapping of the closed lips near the midline by finger or by handle of the hammer → upward movement of lips



### 2. Palmo-mental

○ Scratch thenar eminence → contraction of the mentalis muscle of the chin

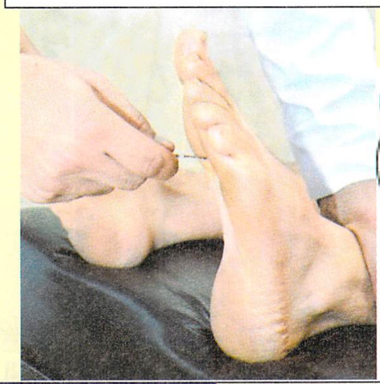


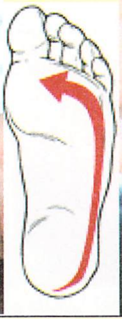


## ❖ Superficial reflexes: Planter, Abdominal, Cremasteric, gluteal & Anal.

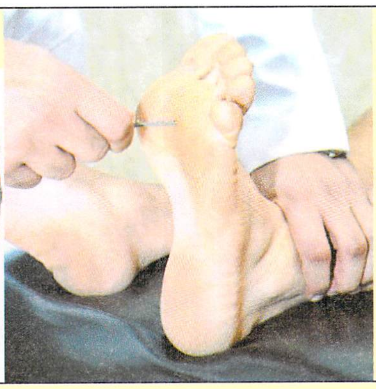
### Superficial reflex : Planter reflex (S1, 2 mainly S1)

**Normal:** Flexor response





**Abnormal:** Extensor response



❖ فكرته :
بطريقة ما
stimulate قدم
العيان وشوف
النتيجة في الصباع
الكبير

### I. Technique of Babinski method:

خلي رجل العيان مفرودة على السرير واستخدم مفتاح وامشي على ال lateral side من القدم ثم لف مع نهاية الصوابع وقف قبل بداية الصباع الكبير

1) **Normal:** Flexor response : planter flexion of toes

2) **Abnormal :**

**A.** Extensor response = Babinski sign = +ve Babinski : dorsiflexion of big toe (± fanning of other toes):

➯ **Causes :**

1. Δ (± extra Δ) tract lesion
2. Infants : 1st year of life
3. Under anesthesia
4. Deep sleep & Deep coma

→ It is considered sure sign of UMNL

☠ N.B.: -ve Babinski مافيش حاجة اسمها

**B.** Absent محصلش حاجة :

➯ Causes of absent (Equivocal) response:

- Loss of sensation over the sole of the foot
- Cold or thick skin
- LMNL at S1
- Shock stage of UMNL
- Total paralysis of extensors of big toe e.g. myopathy
- Marked foot deformities

### II. Other Techniques to elicit planter reflex:

**A.** Indications:

1) Babinski can't be done e.g. injury to the sole of the foot
2) For reinforcement & Equivocal Babinski

**B.** Techniques :

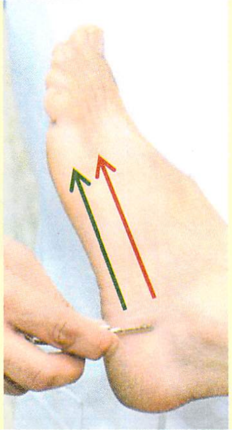
1) **Shaddock:**
- Lateral aspect of dorsum of foot from lateral malleolus to little toe

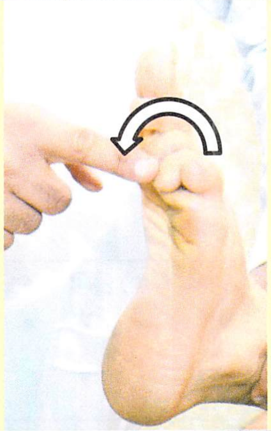
2) **Barada:**
- Lateral border of the foot

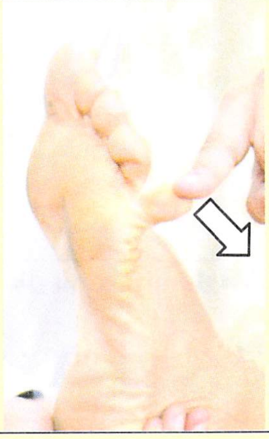
3) **Gonda:**
- 3rd & 4th toes are passively flexed then suddenly release

4) **Stransky:**
- Abduct little toe then suddenly release

- Red line : Shaddock
- Green Line : Barada



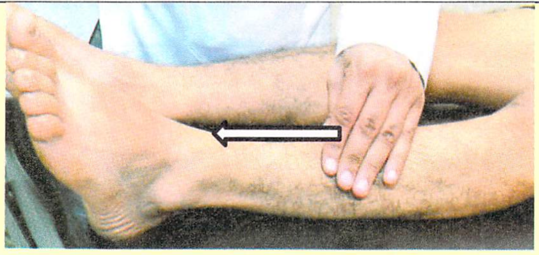


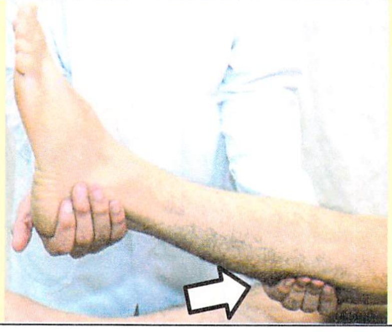


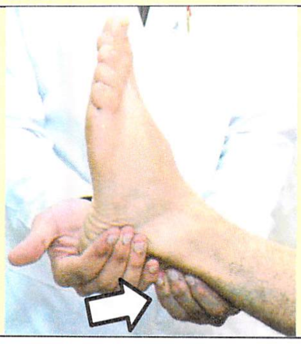
5) **Oppenheim:**
- Firm pressure in the lower part of the shaft of the tibia

6) **Gordon:**
- Calf muscles are firmly pinched

7) **Schaeffer:**
- Tendon Achilles is firmly pinched

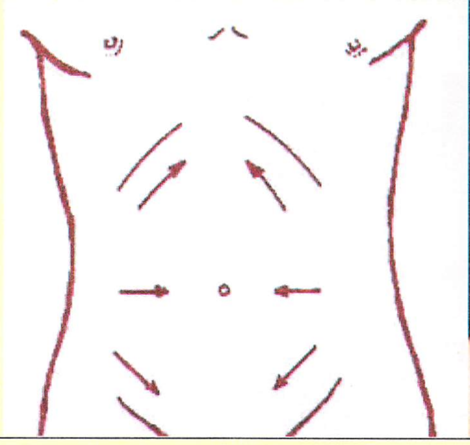






## Superficial reflexes :

### 1. Abdominal



❖ **Technique :**

1) اكشف بطن العيان
2) حاول انك relax abdominal muscles ← قول للعيان خد نفس جامد وخرجه
3) استخدم دبوس أو نهاية tongue depressor مكسورة
4) اعمل scratch من بره لجوه في ثلاثة level على الناحيتين

❖ **Center : T6-T12**

- Upper abdomen : T6-T8
- Middle abdomen : T8-T10
- Lower abdomen: T10-12

❖ **Normal response:** contraction of abdominal muscles ± pull of the umbilicus towards the stimulator

❖ **Significance :** leveling in paraplegia

| ❖ Lost abdominal reflexes : | ❖ Exaggerated abdominal reflexes : |
|---|---|
| 1. UMNL above level of segmental supply of reflex<br>2. LMNL affecting reflex arc itself<br>3. Severe weakness & wasting of muscles e.g. myopathy<br>4. Obesity & ascites | • Psychoneurosis |

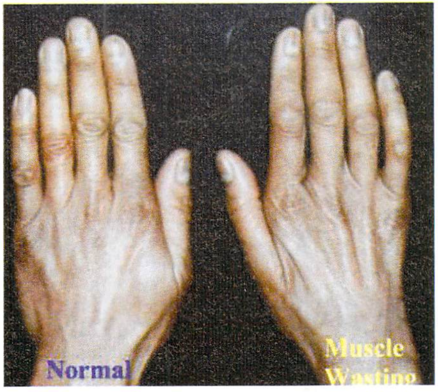
| 2. Cremasteric (L1) | 3. Gluteal (L4,5) | 4. Anal (S3,4,5) |
|---|---|---|
| ○ Stroke with a pointed but not sharp instrument over the skin of the upper part of the medial aspect of the thigh → contraction of cremastric muscles → elevation of the testicle | ○ Stroke with a pointed but not sharp instrument across one buttock → contraction of the ipsilateral gluteal muscle | ○ Scratch the skin of the perianal region → contraction of external anal sphincter |

# DISCUSSION ON MOTOR EXAMINATION & REFLEXES

❖ **What are the causes of muscle wasting ?**

1) **Bilateral symmetrical, proximal : myopathy**
2) **Bilateral, symmetrical, distal : Peripheral neuropathy**
3) **Diffuse : UMNL**
4) **Patchy or segmental : AHCs lesions**
5) **Generalized : elderly, malnutrition, malignancy**

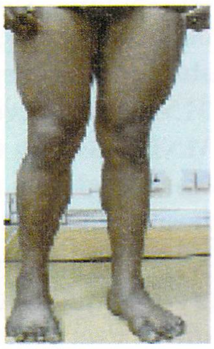
❖ **What are the causes of wasting of small muscles of hand? Supplied by C8-T1**



1) **AHCs lesions e.g. poliomyelitis & syringomyelia**
2) **Anterior roots & spinal nerve lesion e.g. cervical spondylosis**
3) **Lower brachial plexus lesion: cervical rib**
4) **Peripheral neuropathy & carpal tunnel syndrome**
5) **Myasthenia gravis**
6) **Muscle lesion: distal type of myopathy "Gower disease"**
7) **Others : rheumatoid arthritis & myxedema**

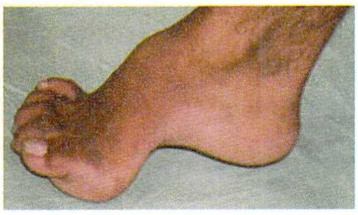
**What are the causes of Pseudohypertrophy?**

1) **Segmental : Duchenne & Becker myopathy**
2) **Generalized : myotonia congenita "young Herculean" , myxedema & acromegaly.**



❖ **What are the causes of pes cavus?**

1) **Fredriech's ataxia**
2) **Peroneal muscle atrophy**
3) **Duchenne myopathy**
4) **Syringomyelia**
5) **Severe wasting of intrinsic foot muscles**



❖ **What are the diseases associated with marked tropic changes?**

| | | |
|---|---|---|
| ○ **Cauda equina** | ○ **Syringomyelia** | ○ **Tabes dorsalis** |
| ○ **Peripheral neuritis especially diabetic, leprotic** | | |

❖ **What do you know about Gower ?**

1. **Gower sign : climbing test**
2. **Gower test : muscle tone at shoulder**
3. **Gower disease : distal type of myopathy**

❖ **What is meant by tonic atrophy & causes?**

- **Tonic atrophy : combined signs of LMNL in the form of wasting of muscles with signs of UMNL in the form of hypertonia and hyperreflexia**
- **Causes:**

| | |
|---|---|
| 1. **Posterolateral cervical spondylosis** | 2. **Amyotrophic lateral sclerosis** |

❖ **What are the sure signs of pyramidal lesion (UMNL)?**

1. **Plantar reflex: Babinski sign**
2. **Organic sustained clonus**
3. **In bilateral pyramidal lesion : precipitancy , positive jaw jerk**

### ❖ What are the causes of .... ?

| Hypotonia | Hyporeflexia |
|---|---|
| 1. LMNL : lesion of the reflex arc:<br>A. Afferent (sensory) limb : PN & tabes dorsalis<br>B. Center (AHC) : poliomyelitis & MND<br>C. Efferent (motor) limb: PN<br>D. Effector (muscle): myopathy & myasthenia gravis<br>2. Posterior column lesions<br>3. Cerebellar lesions (ataxia)<br>4. Extrapyramidal lesions (chorea)<br>5. Shock stage of UMNL | |
| | Extrapyramidal lesion: parkinsonism |

### ❖ What are the causes of .... ?

| Hypertonia | Hyperreflexia |
|---|---|
| ○ Pyramidal lesion.ie UMNL (spasticity) | |
| ○ Extrapyramidal lesion (rigidity) i.e. parkinsonism | ○ Tetany & Thyrotoxicosis |
| ○ Meningeal irritation , Myotonia, Catatonia &Hysterical | |

### ❖ What are the differences between spasticity & rigidity ?

| | Spasticity | Rigidity |
|---|---|---|
| ▪ Cause | ○ Pyramidal lesion | ○ Extrapyramidal lesion |
| ▪ Distribution | ○ Antigravity muscle:<br>- Flexors of UL<br>- Extensors of LL & trunk<br>○ Distal > proximal | ○ Antigravity & progravity muscle:<br>- Flexors of UL, LL & trunk<br>○ Proximal > distal |
| ▪ Character | ○ Clasp – knife | ○ Lead pipe: uniform resistance<br>○ Cog wheel: resistance is intermittent & interrupted by tremors |
| ▪ Deep reflexes | ○ Hyperreflexia | ○ Hyporeflexia |

### ❖ Cause of hypertonia and hyporeflexia? Parkinsonism

### ❖ What are the causes of ...?

| ❖ Lost ankle preserved knee reflex | ❖ Lost ankle exaggerated knee reflex | ❖ Lost knee & preserved ankle reflex | ❖ Lost knee exaggerated ankle reflex |
|---|---|---|---|
| • Friediech's ataxia | • Friediech's ataxia | • Cauda equina (L2,3,4) | • Paraplegia + cauda affecting L2,3,4 |
| • SCD | • SCD | ❖ What are the causes of pendular knee jerk ?<br>• Cerebellar ataxia<br>• Chorea | |
| • Peripheral neuropathy | • Pellagra | | |
| • Epiconus lesion | | | |
| • Cauda equina lesion of S1 | | | |
| • Holmes - Adies myotonic pupil | | | |

## 2. Examination of sensory system

| 1) Superficial sensation | 2) Deep sensation | 3) Cortical sensation |
|---|---|---|

### 1) Superficial sensation:

| 1) Pain | 2) Touch | 3) Temperature |
|---|---|---|
| ○ إستخدم دبوس | ○ استخدم فرشاة أو قطن | ○ باستخدام أنابيب اختبار تحوي ماء بارد وماء ساخن |

1. Compare both sides of body between right & left side; starting by healthy side :

| ❀ At the level of : | ❀ Value : |
|---|---|
| ○ Head , trunk (chest) , UL (arm) , LL (Leg) | ○ Hemi-anesthesia (hemiplegia) |

2. Compare between Head , trunk (chest, abdomen) , UL (arm) , LL (Leg) of same side and after finishing do the opposite side :

- Better UL (arm) & upper trunk (chest), less in lower trunk (abdomen) & LL (Leg) → extra-medullary lesion → sensory level of paraplegia (detect the level)
- Better in LL (Leg) & lower trunk (abdomen) less in upper trunk (chest) & UL (arm) & → intra-medullary lesion → jacket sensory loss of paraplegia

→ Technique of sensory level:

○ إبدأ من رجليه صاعداً لأعلى وقوله هاشكك ولما الاحساس يزيد قول وشاور

↳ Radicular supply of the trunk:

| | |
|---|---|
| ○ Up to Axilla : T2 | ○ Up to Nibble: T5 (T4) |
| ○ Up to Costal margin: T6 | ○ Up to Umbilicus: T10 |
| ○ Up to Inguinal ligament :T12 | |

3. Compare distal with proximal part of the same limb, after finishing do the opposite side:

- Value : detect the level of stock & glove hyposthesia in peripheral neuropathy

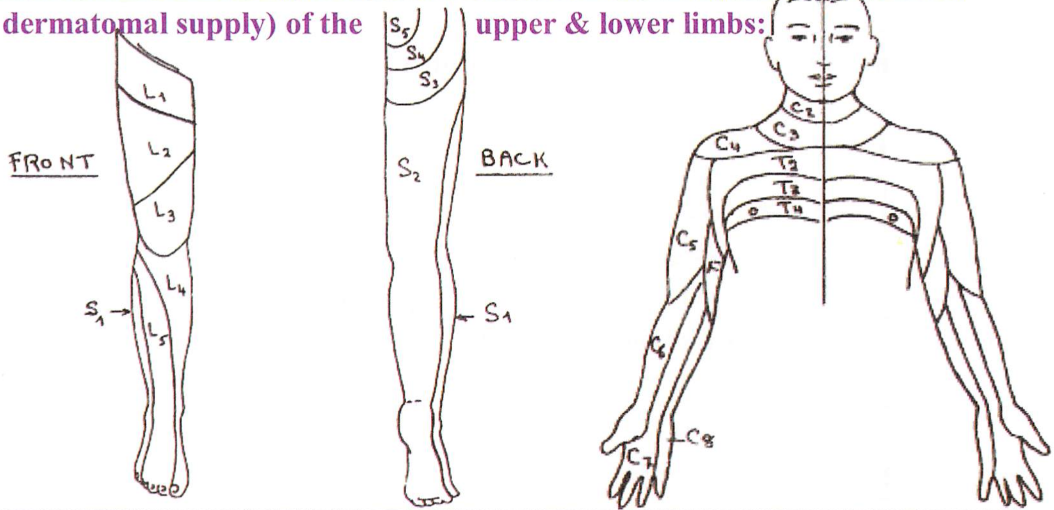
○ إبدأ من very distal واطلع حته حته
○ قول للعيان هشكك ولما الإحساس يزيد قول وشاور , علشان تطلع ال level بتاع الجوانتي والشراب

4. Circumferential comparison between lateral, medial, posterior aspects of the limb, after finishing do the opposite side:

- If sensation is defective in one dermatome : radicular sensory loss in that dermatome as in cauda equina lesion

☠ If the 4 above screening tests were normal → intact superficial sensation

↳ Radicular supply (= dermatomal supply) of the upper & lower limbs:



| Upper limb | | Lower limb | |
|---|---|---|---|
| C2 | Angle of mandible | L1 | Upper 1/3 front of thigh |
| C3 | Neck | L2 | middle1/3 front of thigh |
| C4 | Shoulder | L3 | Lower 1/3 front of thigh |
| C5 | Lateral aspect of arm | L4 | Big toe |
| C6 | Thumb | L5 | Middle 3 toes |
| C7 | Middle 3 fingers | S1 | Little toe |
| C8 | Little finger | S2 | Posterior aspect of thigh, leg & sole of foot |
| T1 | Medial aspect of arm | S3,4,5 | Around anus |
| T2-7 | Thorax | T8-12 | abdomen |

## 2) Deep sensation:

| | | | | |
|---|---|---|---|---|
| 1) Sense of position | 2) Sense of movement | 3) Vibration sense (bone sense) | 4) Muscle sense (pressure sense) | 5) Nerve sense (electric sense) |

❖ **N.B.:**

- Joint sense = sense of position + sense of movement
- Deep pain sensation = muscle sense + nerve sense

1. **Joint sense :**

❖ **فكرته:** وانت مغمض عينك تحس مكان صوابعك وأطرافك وهل هي متحركة ولا ثابتة

❖ **طريقة الفحص:**

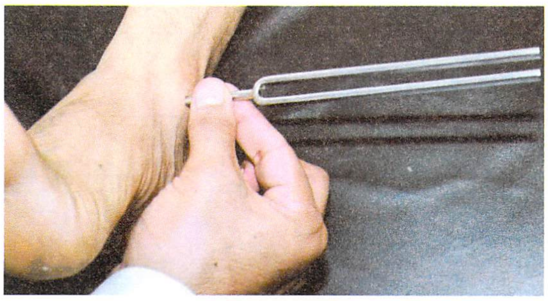
1) لو يتم الفحص في ال LL استخدم ال big toe , لو يتم الفحص في ال UL استخدم ال index finger
2) امسك صباع رجله الكبير من الجانبين وبإيدك التانية ضم الصوابع الأخرى to avoid friction
3) اعط العيان مثال وهو مفتح عينيه وقوله كده يعني فوق وكده يعني تحت , كده بيتحرك , كده واقف
4) ثم قوله غمض عينيك وأسأله شويه

2. **Vibration sense**

❖ Using tuning fork 128 Hz/ sec

❖ Test : Place it over the following bony prominence :

- ○ **Medial malleolus:** peripheral nerve
- ○ **ASIS** (anterior superior iliac spine): posterior column
- ○ **Forehead:** thalamus



❖ **طريقة الفحص :**

1) **إبدأ بال forehead:**
   - اخبط الشوكة وحطها على ال forehead واسأله حاسس بايه
   - لازم يقولك حاسس بزنة
   - لو مقالش كدا قوله ديه زنة واخبطها مرة تانية وخليه يحسها
   - لو حاسس تبقى ال thalamus سليمة
2) **ثم اختبر ال medial malleolus:**
   - لو حاسس يبقى posterior column وال peripheral nerve سليم
   - لو مش حاسس يبقى في lesion في ال : posterior column أو peripheral nerve
3) **اختبر ال ASIS:**
   - لو مش حاسس يبقى ال posterior column lesion
   - لو حاسس يبقى ال peripheral neuropathy

هل ممكن تستخدم ال vibration sense في ال UL ؟ نعم :

| | |
|---|---|
| ○ Radial styloid process & olecranon: peripheral nerve | ○ Clavicle: posterior column |

3. **Muscle sense :**

❖ **Technique :**

- العيان يتني رجليه نصف تنية وتضغط على ال calf muscle ضغطه بسيطة
- وبص على وش العيان وشوفه رد فعله ... طبيعي ولا هيتألم ولا مش هيتألم
- لو لقيته متألمش إسأله حاسس بضغط ايدي ولا لأ علشان تتأكد

- ○ Normally: disagreeable sense
- ○ Exaggerated : tender calf muscles ; causes: DM, DVT, myositis, Landry -Guillan - Barre syndrome
- ○ Lost muscle sense : Abadie's sign→ neurosyphilis

4. **Nerve sense :** rolling of the ulnar nerve or lateral popliteal nerve against bone → electric sense

5. **Romberg's test:**
   - ○ Done when one or more of the deep sensations are lost

❖ **فكرته:**

- الشخص الطبيعي لو قام ووقف وغمض عينه ← ميحصلش حاجة لأن ال deep sensation عنده سليمة , بينما لو كانت ال deep sensation عنده متأثرة العيان يفقد توازنه ويقع

❖ **طريقة الفحص** : اطلب من العيان:

| | | | |
|---|---|---|---|
| 1) يقف | 2) يضم رجليه | 3) الدكتور يحوط العيان بايده | 4) العيان يغمض عينه |

❖ **Result :** If the patient begins to shake or loses his balance → +ve Romberg's sign

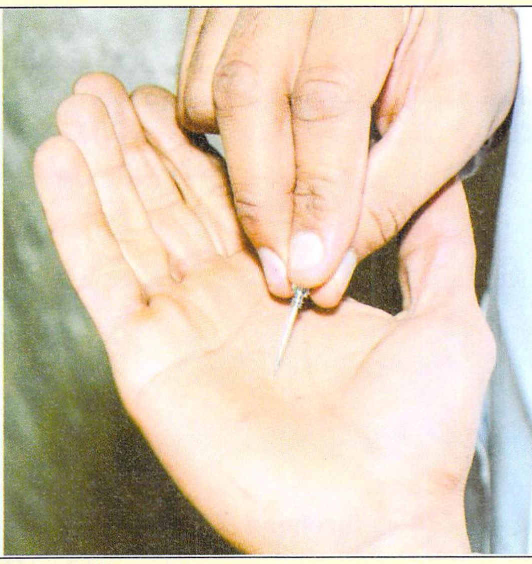
## 3) Cortical sensation:

❖ شروط الفحص :

- لازم يكون ال superficial & deep sensation سليم
- لازم العيان يقفل عينيه في كل الفحوصات
- تتعمل في الناحية ال normal ومتتعملش في الناحية ال diseased

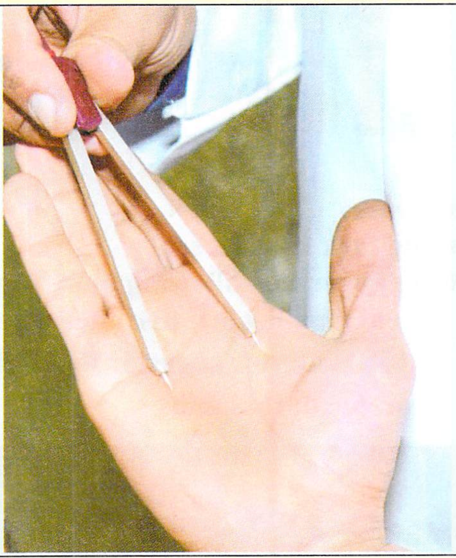
**1. Tactile localization :point localization**

- شكه بالدبوس في إيده وقوله الشكه فين



**2. Tactile discrimination (2 points discrimination):**

- شك العيان شكتين في نفس الوقت
- المسافة ما بين الشكتين 4 سم ( ولو في الظهر 10 سم)
- اسأل العيان دول واحدة ولا اتنين

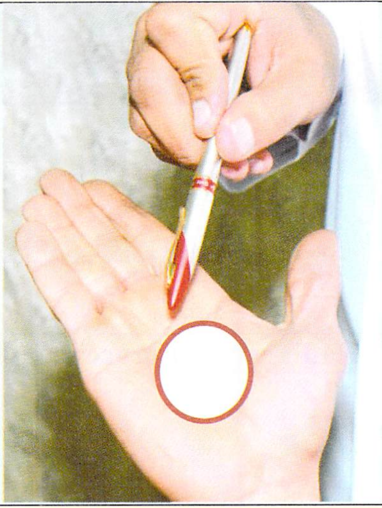


**3. Stereognosis:**

- حط حاجة معرفة في ايد العيان (قلم مثلا) وإسأل ده ايه

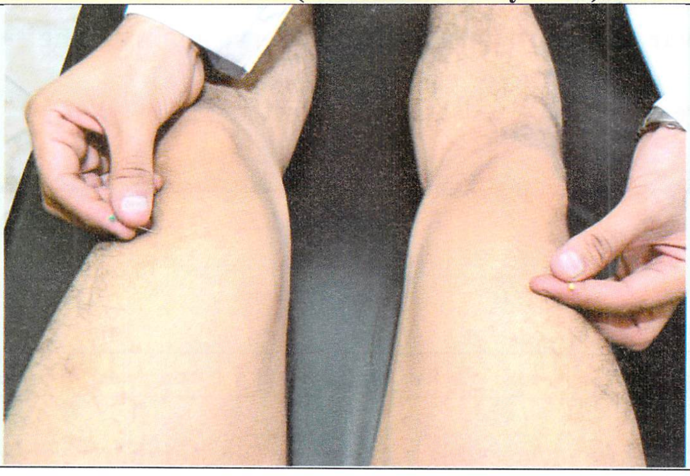
**4. Graphosthesia:**

- إرسم دايره (أو اكتب رقم ) على كف العيان وإسأله انا رسمت ايه ؟



**5. Perceptual rivalry (sensory inattention = sensory extinction)**

- شك العيان شكتين بنفس القوة في نفس الوقت في نفس المكان على الناحيتين في كل من كفيه أو رجله
- وإسأله حاسس بواحدة ولا اتنين
- لو حس بالإتنين يبقى ← cortex سليم
- لو حس بشكه واحدة يبقى ← cortex مضروب ( cortical sensory loss )



# DISCUSSION ON SENSORY EXAMINATION

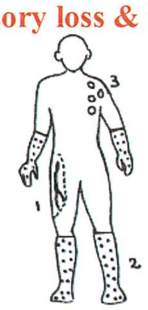
❖ What are types of hypothesia associated with UMNL & LMNL?

| ❖ Types of hyposthesia associating with UMNL: | ❖ Types of hyposthesia associating with LMNL: |
|---|---|
| 1) hemihypothesia :hemiplegia<br>2) Sensory level : paraplegia<br>3) Jacket of dissociated sensory loss : Syringomyelia Intramedullary lesions | 1) Glove & stock : PN<br>2) Radicular sensory loss : cauda equine & spondylosis<br>3) Saddle – shaped area : cauda equine & conus medullaris |

❖ What are the causes of thickened nerve?

| | | |
|---|---|---|
| 1) Interstitial polyneuropathy | 2) Peroneal Muscle Atrophy | 3) Amyloidosis |
| 4) Acromegaly | 5) Myxedema | 6) Neurofibromatosis |

❖ What are the patterns of sensory loss & the site of the lesion?



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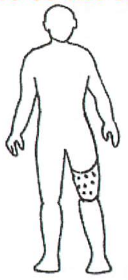

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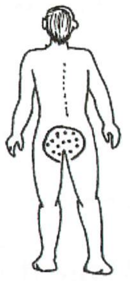

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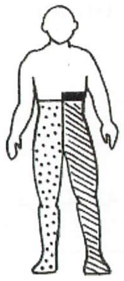

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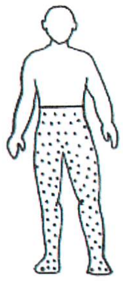

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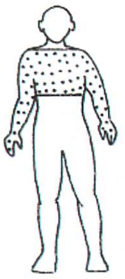

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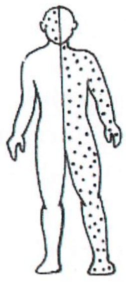

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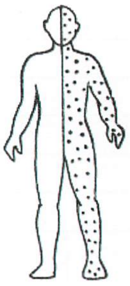


10.

| ❖ Pattern of sensory loss | ❖ Site of the lesion |
|---|---|
| 1) Mononeural<br>2) Stock & glove<br>3) Maculo- anesthetic { Patchy loss in leprosy} | ○ Peripheral nerve lesion |
| 4) Radicular loss | ○ Root lesion |
| 5) Saddle loss | ○ cauda & conus |
| 6) Hemi hypothesia of dissociative nature (Brown - Sequard syndrome) | ○ Unilateral cord lesion |
| 7) Sensory level | ○ Extra-medullary lesion |
| 8) Jacket sensory loss | ○ Intra-medullary lesion |
| 9) Crossed hemihypothesia | ○ Lateral medullary syndrome |
| 10) Hemihypothesia | ○ Capsular & brain stem lesions |
| 11) Cortical sensory loss | ○ Area 1, 2 , 3 of parietal lobe |

| ❖ Causes of hyposthesia of dissociated nature : | ❖ Neurological diseases with intact sensation: |
|---|---|
| • Loss of pain & temp, with preserved deep sensation & fine touch in :<br>1) Syringomyelia & syringobulbia<br>2) Brown Sequard syndrome<br>3) Intramedullary tumors<br>4) Cerebellar artery occlusion syndrome | 1) Muscle disease (myopathy, myotonia, myasthenia gravis & myositis)<br>2) Motor neuron disease<br>3) Marie's ataxia<br>4) Parkinsonism, chorea<br>5) Poliomyelitis<br>6) Hereditary spastic paraplegia |

| ❖ Causes of motor neuropathy | ❖ Causes of sensory neuropathy |
|---|---|
| • Acute infective polyneuritis | • Alcoholic neuropathy |
| • Lead neuropathy | • Arsenic neuropathy |
| • Diphtheritic neuropathy | • Leprotic neuropathy |
| • Porphyria | • Diabetic neuropathy |
|  | • Vitamin deficiency neuropathy |

## 3. Examination of Others : Cranium , back, spine & Gait

| ❖ Examination of cranium | ❖ Examination of back & spine:قعد العيان وبص على ظهره |
|---|---|
| 1. Size<br>2. Shape, sutures, fontanels<br>3. Bony bosses e.g. meningioma<br>4. Tenderness, dilated veins, arterial bruit, nevi<br>5. McEwen sign in brain tumors: Tapping the skull → resonant sound | • In cases of paraplegia, cauda equina, cervical spondylosis:<br>1. Tenderness<br>2. Deformity<br>3. Hair tuft (spina bifida)<br>4. Swelling<br>5. Abnormal pigmentation “cafe' au lait” of Neurofibroma |

❖ Examination of Gait : يقوم العيان ونبص على مشيته

**Done if the patient can walk**

| Lesion | Cause | Gait |
|---|---|---|
| 1) UMNL |  |  |
| A. Unilateral | ○ Hemiplegia | ○ Circumduction |
| B. Bilateral | ○ Paraplegia | ○ Scissoring |
| 2) LMNL |  |  |
| A. Muscle | ○ Myopathy | ○ Waddling |
| B. Peripheral Nerve | ○ Peripheral neuropathy | ○ High steppage |
| 3) Posterior Column | ○ SCD, Tabes dorsalis | ○ Stamping = strike forcibly ground |
| 4) Cerebellum |  |  |
| A. Archicerebellum | ○ Friedriech's ataxia | ○ Standing : swaying (trunkal ataxia)<br>○ Walking : Wide base “drunken” or staggering gait |
| B. Neocerebellum<br>○ Unilateral<br>○ Bilateral | <br>○ Cerebellar astrocytoma<br>○ Marie's ataxia | <br>○ Deviation to one side<br>○ Zigzag gait |
| 5) Extra pyramidal | A. Parkinsonism | ○ Short steppage (mild)<br>○ Shuffling (moderate)<br>○ Festinant (severe) |
|  | B. Chorea | ○ Dancing |
| 6) Hysterical | ❖ Psychological : bizarre, non-injurious & suggestible e.g. :<br>○ Pushing the paralzed limb in front or dragging it behind<br>○ Astasia abasia : inability to stand or walk<br>○ Tandem walking : ask for heal to toe walk, This exaggerate instability |  |

## 4. Examination of Other Systems:

- Examine all systems as mentioned in general examination, but stress on the following :
    - ○ In cases of paraplegia : examine chest (TB)
    - ○ In cases of hemiplegia : examine heart (MS, hypertension)
    - ○ In cases of DM examine all the body for complications of DM

# Diagnosis Of Neurological Case

| a. Etiological Diagnosis | b. Anatomical Diagnosis | c. Functional Diagnosis: |
|---|---|---|
| • Heredofamilial<br>• Symptomatic (vascular, traumatic, inflammation) | • Where is the lesion :<br>- Cortical, spinal cord, cerebellum | • Stage :<br>○ Stage of neuronal shock<br>○ Stage of neuronal recovery<br>○ Stage of improvement with residual<br>• Paralysis<br>• Complication |

**C. Pathological Diagnosis**

❖ What is the lesion:

- Focal : affection of anatomically adjacent structures:
  - Usually asymmetrical, with sensory or motor level
- ▪ Systemic : affection of physiologically related systems:
  - Usually bilateral & symmetrical, without a level, Gradual onset & slowly progressive course
- ▪ Disseminated : affection of more than one focus which are neither anatomically nor physiologically related
  - Usually asymmetrical
  - Without a level
  - Rapid onset & intermittent course

❖ Neurological cases:

- Hemiplegia, Brown Sequard syndrome, Paraplegia, Peripheral neuropathy, Peroneal muscle atrophy, Myopathy, Ataxia, Motor neuron disease, Parkinsonism, Disseminated sclerosis (multiple sclerosis )

## ❖ Summary of neurological examination:

<table>
<tr><td colspan="4">I. General examination:</td></tr>
<tr><td>○ Vital signs</td><td>○ General overview</td><td>○ Systemic overview</td><td>○ Other systems except that of local exam</td></tr>
<tr><td colspan="4">II. Local examination : neurological examination</td></tr>
<tr><td colspan="4">1. Mentality</td></tr>
<tr><td>○ State of consciousness</td><td>○ Orientation to time, place & person</td><td rowspan="2">○ Memory : immediate, recent, remote</td><td rowspan="2">○ Affect (mood)</td></tr>
<tr><td>○ Mentality</td><td>○ Behavior (cooperative)</td></tr>
<tr><td colspan="4">2. Speech</td></tr>
<tr><td colspan="4">○ Aphasia ,( Dysarthria ; slurred, staccato; monotonous, scanning)</td></tr>
<tr><td colspan="4">3. Cranial nerve examination</td></tr>
<tr><td>A. CN1: Smell</td><td colspan="3">B. CN2: acuity of vision, field of vision (confrontation test)</td></tr>
<tr><td colspan="4">C. Ocular nerves : 3,4,6 CN</td></tr>
<tr><td colspan="4">❖ Inspection : ptosis, squint , size of pupil, nystagmus</td></tr>
<tr><td>❖ Power</td><td>Each eye separately</td><td colspan="2">Both eye together (conjugate eye movements</td></tr>
<tr><td>❖ Reflexes</td><td>Accommodation (near)</td><td>Pupillary light</td><td>Ciliospinal</td></tr>
<tr><td></td><td>D. CN 5</td><td>E. CN 7</td><td>F. CN 9,10</td></tr>
<tr><td>❖ Inspection</td><td>○ Hollowness</td><td rowspan="2">○ Frontalis<br>○ Orbicularis oculi<br>○ Buccinators<br>○ Retractor anguli<br>○ Orbicularis oris</td><td rowspan="2">○ Soft palpate movement & uvula</td></tr>
<tr><td>❖ Motor power</td><td>○ Temporalis<br>○ Masseter<br>○ Pterygoid</td></tr>
<tr><td>❖ Sensory</td><td>○ 3 areas in face<br>○ General sensation of anterior 2/3 of tongue</td><td>○ Taste sensation of anterior 2/3 of tongue</td><td>○ General & taste sensation in posterior 1/3 of tongue</td></tr>
<tr><td rowspan="3">❖ Reflexes</td><td>○ Jaw</td><td>○ Glabellar</td><td>○ Pharyngeal</td></tr>
<tr><td>○ Palatal</td><td>----</td><td>○ Palatal</td></tr>
<tr><td colspan="2">○ Corneal (conjunctival)</td><td>----</td></tr>
<tr><td></td><td>G. CN 11</td><td colspan="2">H. CN 12</td></tr>
<tr><td>❖ Inspection</td><td>Shoulder Drop, head tilted to opposite side</td><td colspan="2">Fasciculations, Wasting, Deviation</td></tr>
<tr><td>❖ Motor</td><td>Sternomastoid & trapezius</td><td colspan="2">Power</td></tr>
<tr><td colspan="4">4. Cranial meningeal irritation = neck examination</td></tr>
<tr><td colspan="4">○ Neck rigidity , Opithotonus, Lossegue's sign, Kernig's sign, Brudzinski's sign</td></tr>
<tr><td colspan="4">5. Examination of the motor system</td></tr>
<tr><td colspan="4">A. Inspection</td></tr>
<tr><td>○ Abnormal involuntary movements</td><td>○ Posture of the patient</td><td>○ Circumference of the muscle</td><td>○ Dysplastic changes & Deformities</td></tr>
<tr><td colspan="4">B. Palpation : muscle tone</td></tr>
<tr><td>○ Wrist & ankles</td><td colspan="3">○ Shaking method</td></tr>
<tr><td>○ Elbows & knees</td><td colspan="3">○ Passive flexion & extension</td></tr>
<tr><td rowspan="2">○ Shoulder : Gower's test</td><td colspan="3">○ Hip : rolling & circumduction</td></tr>
<tr><td colspan="3">○ Hip & knees: passive elevation</td></tr>
<tr><td colspan="4">C. Percussion : fasciculations & myotonia</td></tr>
<tr><td colspan="4">D. Muscle power : without resistance & against resistance</td></tr>
<tr><td>○ Shoulder & hip</td><td>Flexion , Extension</td><td>Abduction, Adduction</td><td>Internal, external rotation</td></tr>
<tr><td>○ Elbow & knee</td><td colspan="3">Flexion & extension</td></tr>
<tr><td>○ Wrist</td><td colspan="3">Flexion & extension</td></tr>
<tr><td>○ Ankle</td><td colspan="3">Planter flexion & Dorsiflexion</td></tr>
<tr><td>○ Hands; fingers</td><td>Flexors, Extensors</td><td>Abductors , Adductors</td><td>Opposition , Lumbricles</td></tr>
<tr><td>○ Toes :</td><td colspan="3">Planter flexion & Dorsiflexion</td></tr>
<tr><td>○ Abdominal muscles</td><td colspan="3">Flexors & extensors</td></tr>
<tr><td colspan="4">E. Coordination , repeated 2 times ( once with eye opened & the other with eye closed)</td></tr>
<tr><td>❖ In UL:</td><td>○ Finger to nose</td><td>○ Finger to finger</td><td>○ Finger to fixed doctor finger</td></tr>
<tr><td>❖ In LL :</td><td colspan="3">○ Heel to knee</td></tr>
<tr><td colspan="4">6. Reflexes</td></tr>
<tr><td colspan="3">❖ In UL:</td><td>❖ In LL:</td></tr>
<tr><td colspan="4">A. Deep reflexes :</td></tr>
<tr><td colspan="3">○ Brachioradilis or Supinator , Biceps, Triceps</td><td>○ Tendon Knee jerk, Ankle reflex</td></tr>
<tr><td colspan="4">B. Pathological reflexes : normally absent , if exaggerated they denote UMNL, done only in hyperreflexia only:</td></tr>
<tr><td colspan="3">○ Pectoralis, Deltoid, Supraspinatus, Finger flexion, Wetenberg, Hoffman's</td><td>○ Adductor, Patellar</td></tr>
<tr><td colspan="4">C. Search for clonus only in hyperreflexia :</td></tr>
<tr><td colspan="3">○ Wrist clonus</td><td>○ Ankle clonus, Patellar clonus</td></tr>
<tr><td colspan="4">○ Superficial reflexes</td></tr>
<tr><td>○ Abdominal</td><td>○ Cremasteric</td><td>○ Gluteal , anal</td><td>○ Planter</td></tr>
<tr><td colspan="4">7. Examination of sensory system</td></tr>
<tr><td>○ Superficial :</td><td colspan="3">Pain, touch, temperature</td></tr>
<tr><td>○ Deep sensation</td><td>joint, Vibration</td><td>Muscle & nerve</td><td>Romberg's test</td></tr>
<tr><td>○ Cortical sensation</td><td colspan="3">Tactile localization , Tactile discrimination, Stereognosis, Graphosthesia, Perceptual rivalry</td></tr>
<tr><td colspan="4">8. Examination of others: cranium , back, spine & gait</td></tr>
<tr><td colspan="4">9. Examination of other systems</td></tr>
</table>

## SCHEME OF NEUROLOGY

☠ Examine Superficial Sensation

- Affected
  - In UL & LL
    - Bilateral → A) UMNL: quadriplegia
    - Unilateral → Hemiplegia
  - Free UL sensation, LL sensation affected
    - Sensory level → ↑ Knee reflex → Paraplegia
    - Radicular sensory loss → ↓ or normal knee reflex → Cauda equina lesion
- Free; Purely motor lesion الشكوى هتساعدك

**B) LMNL:**

- ○ Peroneal muscle atrophy → inverted Champaign bottle
- ○ Diabetic periphral neuropathy → other manifestation of DM + blood sugar level
- ○ Lead Peripheral neuropathy → more in UL, mainly motor, brachio-radialis muscle is spared , occupation (battery or printer factory) , ± manifestation of lead toxicity : blue lines in the gum.

**A) Mixed:**

**1- SCD: affection of**

- { PN & Posterior column → ↓ tone & reflexes } & { Pyramidal tract → ↑ tone & reflexes },
- So lesion depend on which type predominate:
  - ○ Flaccid type : if the PN is the predominant
  - ○ Spastic type : if the pyramidal tract lesion is the predominant

**2- Friedriech's ataxia:**

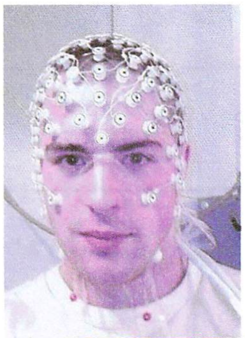
- ○ Peripheral neuropathy (Stock & glove hypoesthesia), Archicerebellum, Pyramidal (paraplegia) & Posterior column affection

➩ Free; Purely motor lesion الشكوى هتساعدك

- Weakness → ضعف → Type of weakness by Babinski
  - Pure UMNL → Hereditary spastic paraplegia (paraplegia without level)
  - Pure LMNL →
    - Myopathy (wasting is severe)
    - Myasthenia: fatigability test (diurnal variation and descending March)
    - Myotonia : Myotonic phenomenon
  - Mixed → MND (fasciculations) (amyotrophic lateral sclerosis)
- Involuntary movements → ايدي بترعش →
  - Parkinsonism → tremors
  - Chorea → jerky movements
- Incoordination: ataxia → بمشي بطوح → Marie's ataxia
  - Neocerebellum:
  - Pyramidal (paraplegia)

# INVESTIGATION OF A NEUROLOGICAL CASE

## I. Non-imaging :



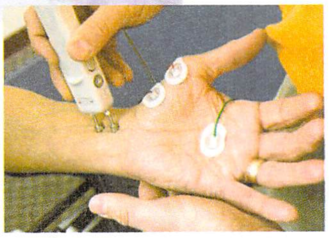
**A. Tests for functions:**

**1) Electroencephalography : EEG**

- Recoded from scalp electrodes on 16 channels simultaneously for 1 - 3 mm.
- Abnormalities in :
  - a) Epilepsy : spike or spike wave abnormalities
  - b) Diffuse brain disorders : encephalitis, dementia
  - c) Brain death : isoelectric = flat

**2) Evoked potentials EP :**

- Stimulation of any sensory receptor evokes an electrical response
- The recording of evoked signals helps clinically – unsuspected lesions :
  - a) **Visual evoked potential (VEP)** : for lesion in visual pathway
  - b) **Brain stem auditory evoked potential (BAEP)** : for brain stem lesion
  - c) **Somato-sensory evoked potential (SSEP):** for lesion in sensory pathway



**3) Nerve conduction study & electromyography (EMG)**

- Using surface needle electrode to record action potentials from muscles or nerves close to skin

**B. Special tests :**

1) **Blood tests:**
   - A. **Antiphospholipid antibodies** : diagnose stroke due to hypercoagulable state
   - B. **Antibodies to acetylcholine receptor** ; in myasthenia gravis
   - C. **Vitamin B12 deficiency** in anemia
2) **Lumbar Puncture:**
   - ○ Diagnosis of meningitis & encephalitis
   - ○ Measurement of CSF pressure : in ↑ ICT

3) **Biopsy:**
   - A. **Muscle biopsy** : for muscle disorder
   - B. **Peripheral nerve biopsy** : usually sural nerve at ankle, for diagnosis of polyneuropathy
   - C. **CT-guided stereotactic brain biopsy** : for intracranial mass

## II. Imaging :

1) **Plain X-rays :** skull, neck

2) **CT:** detect:

- ○ **Pathology inside skull :** bone, blood (intracerebral, subdural, subarachnoid hemorrhage)
- ○ **Brain:** atrophy, tumors
- ○ **Contrast CT :** CT following myelography

→ Limitations : missed lesions if < 1 cm, near skull

3) **Myelography** : for spinal cord (myelography) or nerve root (radiculography)

4) **Angiography** : carotid & vertebral angiography for aneurysm, AV malformation

5) **Ultrasound:**

- ○ **Doppler** imaging of blood vessels, Carotid **duplex**

6) **Magnetic resonance (MR):**

- ○ **MR imaging (MRI)**
- ○ **MR angiography (MRA)**
- ○ **Advantages over CT :**
  - ↳ Distinguish clearly between white & gray matter
  - ↳ Detect 0.5 cm lesion (higher resolution), Direct imaging of spinal cord & root
  - ↳ No radiation, MRA images blood vessels without need for contrast

→ **Limitations :** time / coast – claustrophobia

7) **Radioisotopes** : assess blood flow & specific areas of brain

A. **Single Photon Emission Computerized Tomography "SPECT"**

B. **Position Emission Tomography "PET"**

C. **Isotopic scan :**

- Isotope brain scan : for intracranial lesions not detected by CT or MRI
- Isotope brain scan : Technetium 99 – TC 99m for skull & vertebral lesions (metastases)

→ For more details about imaging, ECG, Clinical pathology,
see Paraclinical Made easy for the author.

## CLINICAL DISCUSSION

### ❖ What is Glasgow coma scale?

- A scale to assess the conscious level; it depends on 3 parameters :
- Scale 3 deep coma , scale 15 fully conscious & variable levels of consciousness lies in-between

| Eye opening | | Verbal response | | Motor response | |
|---|---|---|---|---|---|
| 4 | Spontaneous | 5 | Oriented to time & place | 6 | Obeys commands |
| 3 | To speech | 4 | Confused words | 5 | Localize pain |
| 2 | To pain | 3 | Inappropriate words | 4 | Withdraw to pain |
| 1 | None | 2 | Inappropriate sounds | 3 | Flex to pain |
| | | 1 | None | 2 | Extend to pain |
| | | | | 1 | None |

### ❖ What are causes of disturbed conscious level (coma)?

A. Hysterical

B. Organic (intra-cranial & extra-cranial)

| A. Intra-cranial causes | B. Extra-cranial causes |
|---|---|
| 1. Traumatic e.g. Head injury | 1) Toxic : morphine, opiate |
| 2. Inflammatory : | 2) Hypoxia : anemia |
| o Encephalitis , meningitis , brain abscess | 3) Ischemic : cardiac arrest |
| 3. Vascular : | 4) Endocrinal : addisonian crisis |
| o Cerebral hemorrhage, embolism , thrombosis | 5) Metabolic : |
| o Subarachnoid hemorrhage | o Hepatic encephalopathy = LCF |
| o Subdural hematoma | o Uremic encephalopathy = renal failure |
| o Hypertensive encephalopathy | o Hypoglycemia coma |
| 4. Neoplastic : primary or secondary | o Diabetic Ketoacidosis |
| 5. Post-ictal state of epilepsy | o Diabetic hyperosmolar non ketotic coma |

### ❖ How to differentiate intra from extra-cranial causes of coma ?

- Intra-cranial causes associated with signs of lateralization

### ❖ What are signs of lateralization?

- Motor : asymmetric deep reflexes, unilateral positive Babinski sign, unilateral hypotonia or hypertonia, , unilateral Jacksonian fits
- Head: facial asymmetry, unequal pupil, Deviation of eyes to one side, tilting of the head to one side

## FREQUENTLY ASKED QUESTIONS FOR MID & END ROUND EXAM

**Test yourself!**

1. What is pyramidal tract pathway ?
2. What is the dermatomal supply of the UL & LL?
3. What are criteria of LMNL?
4. What are criteria of UMNL?
5. What is the nerve supply of tongue?
6. What are the sure signs of bilateral pyramidal tract lesion?
7. What is meant by Gower's test, Gower's sign & Gower's disease?
8. What is grading of muscle power?
9. What is grading of deep reflex?
10. What is inverted supinator reflex?
11. What are causes of Babinski sign?
12. What are causes of equivocal planter reflex?
13. What are causes of hyperreflexia?
14. What are causes of hyporeflexia?
15. What are causes of lost ankle, preserved knee reflex?
16. What are causes of lost ankle, exaggerated knee reflex?
17. What are sure signs of pyramidal tract lesion?
18. What are causes of hypotonia?
19. Pattern of sensory loss
20. Gait in pyramidal tract lesion & other gaits you know
21. What are the differences between rigidity & spasticity ?
22. What is the root value of the following reflex:
    - Biceps, triceps, Brachioradialis , knee, ankle, adductor, patellar, jaw, glabellar, corneal & conjunctival, pharyngeal, palatal , planter?
23. All questions answered in the clinical discussion are very important.

## O.S.C.E QUESTIONS

- Examine for pyramidal tract lesion in LL
- Examine deep & cortical sensation
- Search for cerebellar lesion & superficial sensation
- Examine trigeminal nerve & deep sensation of LL
- Examine motor system of lower limb ( hemiplegia , paraplegia )
- Examine motor system lower limb (deep reflex not required)
- Power and tone of LL
- Examine motor system of both UL
- Examine motor part of facial nerve & deep sensation of body
- Examine 3, 4,6 cranial nerves
- Deep reflexes of UL
- Reflexes of LL
- Examine motor system of both LL "reflexes not required"
- Examine motor power of both LL
- Reflexes of both upper limbs
- Examine cranial nerves (5th, 7th, 12th )

# Hemiplegia

❖ **Level of the lesion:**

| A. Cerebral | B. Brain stem | C. Spinal cord |
|---|---|---|
| ○ Cortical: coma or convulsions, aphasia<br>○ Subcortical : more extensive , coma<br>○ Capsular: 99% of our cases | ○ Crossed hemiplegia : CN palsy on opposite side of the hemiplegia | ○ Brown Sequard syndrome: no CN affection |

❖ **Evidence of cerebral hemiplegia :**

1) Cranial nerve lesion → not spinal
2) Not crossed hemiplegia → not brainstem

❖ **Characters of capsular hemiplegia :**

1) No coma, convulsion & aphasia → not cortical
2) Complete hemiplegia associated with UMN facial & hypoglossal paralysis on opposite side of the lesion
3) Complete hemi-hypothesia on opposite side of the lesion

❖ **Etiology :**

1) **Vascular :** 99% of our cases are due to vascular cause (stroke)
   - ○ Acute onset & regressive course
   - ○ The most common cause
2) No fever or meningeal irritation → not inflammatory
3) No history of trauma → not traumatic
4) Not gradual onset & progressive course → not neoplastic
5) No remittent course → not demyelination

❖ **Type of vascular lesion:**

| | A. Embolism | B. Thrombosis |
|---|---|---|
| History | | |
| Personal | Young , middle age | Old age |
| Past | Rheumatic fever | HTN, DM |
| HPI (Onset) | Seconds | Hours |
| Associations | Dyspnea (MS)<br>Palpitation (AF) | Anginal chest pain (atherosclerosis of the coronaries) |
| Examination | | |
| Pulse | Irregular (AF) | regular |
| Blood pressure | Normal | HTN |
| Heart | Mitral stenosis murmur | Ischemic heart disease |
| N.B.: Hemorrhage : early death | | |

❖ **Which artery is occluded and why ?** According to presentation :

1. **Capsular branch of Middle Cerebral Artery "lenticulo striate":**

- The only one which gives complete hemiplegia (UL = LL)
- The commonest to be occluded as its direct continuation of carotid artery

2. Main branch of MCA : UL > LL , aphasia is present
3. Capsular branch of ACA : monoplegia only
4. Main branch of ACA : LL > UL - mentality changes are present
5. Capsular branch of PCA : thalamic syndrome
6. ICA: Ipsilateral blindness, absent carotid pulsation (palpated in tonsillar fossa)

❖ **Stage :**

| A. Stage of neuronal shock | B. Stage of neuronal recovery | C. Stage of spasticity |
|---|---|---|
| ○ Complete paralysis | ○ Mild improvement in power | ○ Marked improvement in power (not distal) |
| ○ Lost tone, deep reflexes | ○ Reappearance of tone , deep reflexes | ○ Hypertonia, hyper-reflexia |

❖ **Signs of pyramidal tract lesion; organic lesion:**

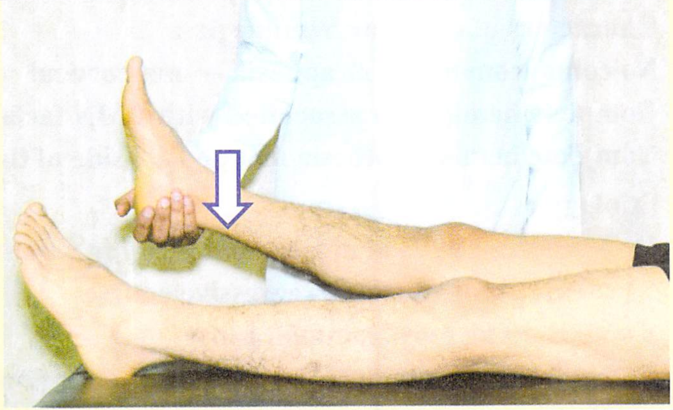
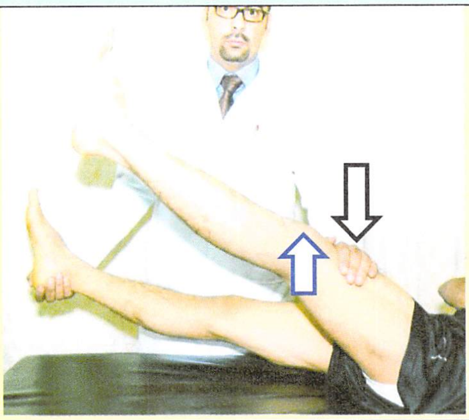
- **Clonus, Positive Babinski sign, Positive pathological reflexes, Hyper-reflexia & Hypertonia**

❖ **Differential diagnosis from hysterical by:**

○ **Side gait test**
○ **Babinski sign**
○ **Hoover sign:**

> ☠ **Remember : 2 Hoover sign :**
>
> 1. **Chest : Inspiratory indrawing of costal margin in COPD due to low flat diaphragm ( See before )**
> 2. **Neurology: in hemiplegia to differentiate between organic and hysterical causes**

❖ **طريقة الفحص : نيم العيان على السرير**

| **1) حط إيدك تحت كعب الرجل المريضة واطلب منه يضغط بها على إيدك** | **2) خلي العيان يعمل بالرجل السليمة**<br>**flexion to the hip against resistance** |
|---|---|
|  |  |

❖ **النتيجة:**

- **لو محستش بضغط على ايديك من الرجل المريضة في المرة الأولى وحسيتها في التانية تبقى الحالة hysterical**
  **وبكده تبقى Positive Hoover's sign**
- **لو محستش بضغط على ايديك في الحالتين تبقى الحالة organic**

❖ **Gait: circumduction gait**

❖ **What is the best investigation in hemiplegia? CT**

❖ **What is the treatment of hemiplegia?**

- **Care of comatose, Physiotherapy**
- **Treatment of the cause: (CVS causes)**

**- Embolic cases → anti-coagulant**
**- Thrombotic cases → antiplatelet**

❖ **N.B.: Any patient with stroke you must give special attention to carotid artery by :**

- **Examination : pulse**
- **Investigation : Doppler, Duplex, MRA**

❖ **Example of diagnosis :**

- **Organic right hemiplegia, it is embolic at the capsular level, the patient is at the spastic stage**

## Brown Sequard syndrome
## Spinal hemiplegia
## (Hemi-section of spinal cord)

❖ **Definition : lesion is on one side of the cord & it's situated between C1 & C5 segments**

❖ **Etiology : traumatic : stab wound , disc prolapse**

❖ **Clinical picture :**

1. **Hemiplegia on the same side of the lesion**

- **↑↑↑ tone, deep reflexes , +ve Babinski & Weakness of Δ tract distribution**

2. **Sensory ataxia on the same side of the lesion : Posterior column affection, deep sensory loss**
3. **Superficial sensory loss on the opposite side of the lesion : Pain , temperature sensation**
4. **No cranial nerve affection**

❖ **Investigations: CT, MRI**

❖ **Treatment :as hemiplegia but no need for care of comatose patient & medication given for vascular causes**

## Capsular hemiplegia, Thrombotic

- **Personal history:** A known diabetic and hypertensive patient, …. (name) …. male patient, 45 years old, driver, from Cairo, has 3 off spring, the youngest is ten years old, heavy smoker, Rt. handed.
- **Complaint:** Heaviness on Rt. upper and lower limbs of 2 years duration.
- **HPI:**
- The condition started 2 years ago and reached its complete picture within hours. This onset was not associated with fever, trauma, vomiting, coma or convulsion. The patient at first developed **complete paralysis** associated with **flaccidity, tingling and numbness** in the Rt. upper and lower limbs and also had a **speech defect.**
- 6 weeks later, the patient experienced **weakness of gradual onset** associated with **stiffness with no wasting or twitches**. This weakness affected the Rt. upper and lower limbs affecting **distal** more than proximal muscles, **abductor** more than adductor muscles, **extensor** more than flexors muscles in Rt. upper limb and **flexor** more than extensor muscles in Rt. lower limb. No involuntary movements. The condition was associated with **loss of sensation** in Rt. Upper and lower limbs and the patient felt as if his Rt. leg **walks on cotton** and there is **marked improvement in speech.**
- Apart from **accumulation of food** behind Rt. cheek, **drippling of saliva** from Rt. side of mouth, **deviation of mouth** to lt. side, **deviation of tongue** to the Rt. Side and **dropping of the Rt. Shoulder**, There are no symptoms suggesting other cranial nerve affection.
  - No symptoms of **sphincteric** affection, No symptoms of increased **I.C.T.**
  - No symptoms of **cardio vascular system** affection, No other system affection
- **Past history:**
- Diabetes started 8 years ago and manifested by polyphagia, polyurea, polydypsia and treated by dimicron.
- HTN started 6 years ago and manifested by headache blurred vision and treated by capozid.
- No past history of fever, operation, other drug intake.
- **Family history :**
- No similar condition in family. No consanguinity, No common disease in family.
- **General examination :**
- **Temperature:** 37° c.
- **Blood Pressure:** 130/70 (may be higher).
- **Pulse:** regular, 80 beat/minute, average volume, no special character, vessel wall not felt, equal in both sides with intact peripheral pulsation.
- **Mentality:** The patient is fully conscious, well oriented for time, place and person. Average mood and memory. The patient is co-operative with average intelligence.
- **Local examination :**
- **Examination of speech : no aphasia , no dysarthria**
- **Cranial nerve examination :**
- **Facial nerve : by inspection,** there is obliterated right nasolabial fold but symmetrical forehead, no tears, no drippling of saliva, no deviation of the mouth. **By exam of power,** there is deviation of angle of mouth to left side, The patient can not blow his right cheek and can't whistle but can close his eyes firmly with normal elevation of both eye brows and symmetrical forehead wrinkles on both sides..
- **Hypoglossal nerve :** the tongue is deviated to the Rt. side, decrease power on Rt. side but no fasciculation or wasting.
- **Accessory nerve:** there is affection of trapezius of Rt. Side
- **Trigeminal nerve:** loss of sensation on Rt. side of face.
- Other cranial nerves were examined but no abnormality detected
- **Examination of motor system :**
- **By inspection:**
- There is flexion of Rt. upper limb at elbow, extension in Rt. lower limb at knee.
- No skeletal abnormalities, no trophic changes, no involuntary movement no muscle wasting
- **By palpation:**
- There Is normal tone in lt upper and lower limbs, in Rt. Upper and lower limbs there is hypertonia in the form of spasticity affecting antigravity muscle indicating UMNL in the Rt. upper and lower limbs.
- **By percussion:** No fasciculation or myotonia.

- **Examination of muscle power:**
- There is normal muscle power in Lt. upper and lower limbs, in Rt. limbs: there is weakness affecting distal more than proximal, abductors more than adductors, in the Rt. Upper limb extensors are weaker while in the Rt. Lower limb flexors are more weaker Indicating weakness of Δ tract distribution in the Rt. Upper and lower limbs.
- N.B: power of abdominal muscles showed no abnormality.
- **Coordination :**
- Cannot be examined on Rt. side because of weakness, on Lt. side there is normal coordination proved by finger to nose, finger to finger in left UL in both eye opening and eye closure and finger to doctor's finger only in eye opening and heel to knee to left LL in both eye opening and eye closure.
- **Reflexes:**
  - There is normoreflexra in lt. upper, lower limbs.
  - In Rt. upper limb: hyperreflexia with +ve pathological reflexes.
  - In Rt. lower limb: hyperreflexia with +ve pathological reflexes and +ve clonus.
  - +ve babniski on Rt. side and normal planter response on the left side.
  - Abdmominal reflexes lost on the right side.
- **Sensory:** complete hemi-hypothesia on Rt. side.
- **Back :** no deformities, no pigmentation
- **Gait:** circumduction gait
- **No affection in other system examination**
- **Diagnosis:** Organic Rt. sided hemiplegia. It is thrombotic at capsular level. The patient is in the spastic stage.
- **Why Hemiplegia?**
  - Unilateral UMNL:

1. Tone antigravity + spasticity.
2. Power distribution, progravity, abd.
3. Hyper reflexia + pathological reflexes + clonus.
4. +Ve babniski.
5. Hypoglossal (no fasciculation, wasting) and UMNL facial n. palsy.
6. Complete hemi hypothesia.

- **Why Capsular?**
  - **Motor:** complete hemiplegia.
  - **Sensory:** complete hemi hypothesia.
  - **Not cortical:** no convulsion, coma, aphasia. Usually (monoplegia)
  - **Not spinal:** cranial N affection excludes spinal.
  - **Not brainstem:** not crossed hemiplegia,
- **How would you proceed to manage this case?**
- **Investigation :** CT, MRI, carotid MRA, cardiac.
- **Treatment:** Physiotherapy, Vitamins, Antiplatelet drugs (thrombosis), anticoagulant (embolic)

## Capsular hemiplegia, Embolic

- **Differs from thrombotic hemiplegia in the following :**

### A. History:

- The patient is **younger** at time of stroke.
- The condition reached its complete picture within **seconds.**
- Start with : the condition started .... Years ago by gradual onset, progressive course of exertional dyspnea. At first, it was on climbing the 2nd floor then it became progressively increased till became at rest and the patient had orthopnea he used to sleep on 3 pillows and he had paroxysmal nocturnal dyspnea he waked up after 2 hours of sleep with dyspnea, cough and wheeze .after 15 minutes, relief usually occurred. This dyspnea was associated with rapid irregular palpitation increased with exertion then after ....years the patient developed .... like thrombotic
- Past history of **rheumatic fever**

### B. Examination:

- **Pulse** may be irregular, **Blood pressure** is usually normal, **Cardiac exam** may reveal signs of M.S (may be with AF)

## Spinal hemiplegia

- ❖ **Personal history: ...**
- ❖ **Complaint:** Heaviness on Lt. upper and lower limbs of 6 years duration.
- ❖ **HPI:**
  - The condition started 6 years ago by a car accident. The patient at first had **complete flaccid paralysis** associated with **tingling and numbness** in the Rt. Upper and lower limbs.
  - 2 weeks later, the patient experienced **weakness** of gradual onset and progressive course associated with **stiffness with no wasting or twitches.** This weakness affected the Lt. upper and lower limbs affecting **distal** more than proximal muscles, **abductor** more than adductor muscles, **extensor** more than flexor muscles in Lt. upper limb and **flexor** more than extensor muscles in Lt. lower limb. No involuntary movements.
  - The condition was associated with **loss of sensation** in Rt. Upper and lower limbs and the patient felt as if his Rt. leg **walks on cotton**.
  - No symptoms of **Cranial nerve** affection.
  - No symptoms of **speech** affection.
  - No symptoms of **sphincteric** affection.
  - No symptoms of increased **I.C.T.**
  - No **other system** affection
- ❖ **Past history:** No History of D.M, HPN, drugs or operations.
- ❖ **Family history:**
  - No similar condition in family.
  - No consanguinity.No common diseases in family.
- ❖ **General examination:**
  - **Temperature:** 37° c.
  - **Bl. Pressure:** 120/80.
  - **Pulse:** regular, 70 beat/minute, average volume, no special character, vessel wall not felt, equal in both sides with intact peripheral pulsation.
  - **Mentality:** The patient is fully conscious, well oriented for time, place and person. Average mood and memory. The patient is co-operative with average intelligence.
- ❖ **Local examination:**
- ❖ **Examination of speech :** normal
- ❖ **Examination of CN:** normal
- ❖ **Examination of motor system:**

**Inspection:**

- There is flexion of Lt. upper limb at elbow, extension in Lt. lower limb at knee.
- No skeletal abnormalities, no trophic changes, no involuntary movement, no muscle washing.

**Examination of Tone:**

- There is normal tone in Rt. upper and lower limbs.
- In Lt. Upper and lower limbs there is hypertonia in the from of spasticity affecting antigravity muscle (indicating UMNL in the Lt. upper and lower limbs).

**Percussion:** No fasciculation or myotonia.

↳ **Examination of muscle power:**

- There is normal muscle power in Rt. upper and lower limbs.
- In Lt. upper and lower limbs: there is weakness affecting distal more than proximal muscles, abductor more than adductor muscles, in the Lt. Upper limb extensors are weaker while in the Lt. Lower limb flexors are more weaker (Indicating weakness of Δ tract distribution in the Lt. Upper and lower limbs).

↳ **Coordination:**

- Cannot be examined on Lt. side because of weakness
- On Rt. side there is normal coordination proved by finger to nose, finger to finger, finger to doctor's finger in both eye opening and eye closure.

❖ **Reflexes:**

- **Deep reflexes**
    - There is normoreflexia in Rt. upper, lower limbs.
    - In Lt. upper & Lower limbs: hyperreflexia with +ve pathological reflexes.
- **Superficial reflexes**
    - +ve Babniski on Lt. side and normal planter response on the Rt. side.
    - Abdmominal reflexes: lost on the left side.

❖ **Sensory** :

- **Superficial sensation**: Right sided hemi-hypothesia (not complete i.e. face is spared).
- **Deep sensation**: Deep sensory loss in Lt. upper and lower limbs i.e. lost muscle, nerve, vibration, joint sense with +ve romberg's test. (Post. Column affection).
- **Cortical sensation**: can't be examined.

❖ **Investigation :** CT, MRI

❖ **Treatment :** physiotherapy, vitamins

❖ **Diagnosis : Organic Lt. sided hemiplegia. It is traumatic at spinal level. The patient is in the spastic stage.**

❖ **Why Hemiplegia?** (Unilateral UMNL)

1. Tone spasticity in antigravity muscles.
2. Power distribution of weakness.
3. Hyper reflexia + pathological reflexes.
4. +Ve Babniski.

❖ **Why Spinal?**

- History of **trauma**.
- **No Cranial** Nerve affection.
- **Hemiplegia** on the same side on the lesion.
- Contralateral Hemi-**hypothesia**.
- Ipsilateral **deep sensory** loss.

# Paraplegia

❖ Level of the lesion :

| A. Spinal cord lesion | B. Cerebral lesion | C. Brain stem lesion |
|---|---|---|
| ○ Focal , systemic or disseminated | ○ ↑ ICT, Coma, convulsions | ○ CN affection |

❖ No ↑ ICT, Coma, convulsions → not cerebral lesion

❖ No CN affection → not brainstem lesion

❖ So our case is , Spinal cord lesion

❖ Causes:

1. With a level (focal):

- Acute onset, regressive course→ inflammatory e.g. Transverse myelitis
- Vascular as anterior spinal artery occlusion → posterior column is preserved
- Gradual onset , progressive course → compression : either extra – or intramedullary block

| | A. Extra-medullary block | B. Intra-medullary block |
|---|---|---|
| ▪ Causes | ○ Vertebral compression as trauma, tumor , degenerative , deformities , Pott's disease (TB)<br>○ Meningeal compression e.g. meningioma | ○ Cord compression as syringomyelia , glioma, epndymoma of the cord |
| | ❖ History | |
| ▪ Duration | ○ Long | ○ Short |
| ▪ Onset | ○ Painful (posterior root irritation) | ○ Painless |
| | ❖ Clinical picture | |
| ▪ Motor | ○ Usually asymmetrical | ○ Usually symmetrical |
| ▪ Sensory | • Sensory level<br>• All types of sensation are diminished below level are including pain, temperature & touch<br>• Early loss of sensation in the saddle area | • Jacket sensory loss<br>• Dissociated sensory loss i.e. loss of pain & temperature with preservation of touch<br>• Late loss of sensation in the saddle area (sacral spare) |
| ▪ Bladder | ○ Late disturbance | ○ Early disturbance |
| | ❖ Investigations | |
| ▪ C.S.F. | ○ Marked lowering of pressure<br>○ Complete dynamic block<br>○ Froin's syndrome : spontaneous coagulation, xanthochromia, cyto-albuminous dissociation | ○ Less marked lowering of pressure<br>○ Partial or no dynamic block.<br>○ No Froin's syndrome |
| ▪ Plain x-ray | ○ Possible vertebral lesion. | ○ Normal x-ray. |
| ▪ Myelography | ○ Saddle shaped block. | ○ Fusiform shape |

2. Without a level: (Systemic & Disseminated):

| A. Systemic : | B. Disseminated : |
|---|---|
| • HSP (Hereditary Spastic Paraplegia).<br>• Pellagra & SCD | • Remission & exacerbation: D.S. (disseminated Sclerosis ), disseminated encephalomyelitis (DEM) |

❖ Stage of paraplegia : flaccid or spastic

| A. Stage of Flaccidity | B. Stage of Spasticity : |
|---|---|
| ○ Stage of neuronal shock<br>○ Immediately follow lesion<br>○ Complete hypotonia & hyporeflexia of acute onset = LMNL like<br>○ Remain 2-6 weeks | ❖ Signs of pyramidal tract lesion; bilateral UMNL:<br>○ Paralysis of paresis of both LL<br>○ Hypertonia (clasp knife)<br>○ Hyper-reflexia with or without clonus<br>○ Positive Babinski<br>○ Precipitancy |

❖ In spastic stage : is it in extension or flexion

| | A. Paraplegia in extension | B. Paraplegia in flexion |
|---|---|---|
| Cause | ○ Pyramidal lesion | ○ Pyramidal & extrapyramidal |
| Timing | ○ After acute shock stage or gradual onset from start | ○ After acute shock stage or after extension stage |
| Hypertonia | ○ More in extensors صعوبة في التني | ○ More in flexors صعوبة في الفرد |
| LL | ○ Extended رجله مفروده في السرير | ○ Flexed رجله متنيه في السرير |
| Deep reflexes | ○ Exaggerated | ○ Less |
| Clonus | ○ Present | ○ Absent |
| Mass reflex | ○ Absent | ○ Present |
| Bladder | ○ Precipitancy | ○ Automatic bladder |

❖ **Piere Marie Foix test:** to detect paraplegia passing from extension to flexion :

↳ Firm passive planter flexion of toes & foot → spontaneous withdrawal reflex i.e. flexion of hip, knee & dorsiflexion of ankle

❖ **Mass reflex :** in paraplegia in flexion :

↳ Scratching skin over medial side of thigh → spontaneous urination, defecation & sweating

↳ Squeezing glans penis →reflex erection & ejaculation

❖ **Gait in paraplegia :** scissoring gait

❖ **Level of the lesion:**

- History level : root pains; girdle pain (site of pain indicates site of compression)
- Motor level (Beevor's sign)
- Reflex level (abdominal reflexes)
- Vertebral level ( راجع الجدول )
- Sensory level ( الأهم في الإمتحان )

❖ **Example of diagnosis :**

- Organic paraplegia of spinal focal type. It's due to extra-medullary lesion at the level of T10.
- The patient is in the spastic stage (in extension).

# Paraplegia

- **Personal history ….**
- **Complaint:** Heaviness of both lower limbs of 22 years duration.
- **HPI:**
  - The condition started 22 years ago when he fell from a height of 3 meters on his back. At 1st the patient suffered from complete **paralysis of both lower limbs with flaccidity** and **girdle pain** at the level of the umbilicus increased by work, coughing, sneezing relieved by rest. Then the patient was admitted to hospital and investigated by X- ray with contrast and Exploratory operation was done.
  - 4 weeks later, the patient experienced gradual onset, progressive course of **weakness** associated with **stiffness, with no wasting or twitches.** This weakness was **distal** more than proximal, in the **abductor** muscles more than adductors, in **flexor** more than extensors with no involuntary movements. This weakness was associated with **diminished sensation** in both lower limbs and the patient felt as if he **walks on cotton**.
  - No symptoms of **sphincteric** affection.
  - No symptoms of increased **I.C.T**., No symptoms of **speech** disorders.
  - No symptoms suggesting other system affection.
- **Past history:**
  - No past history of fever, bilharziasis , drugs or operations.
- **Family history:**
  - No similar condition in family, No consanguinity.
  - No common disease in family
- **General examination:**
  - **Temperature:** 37.2° c.
  - **Bl. Pressure:** 130/70.
  - **Pulse:** regular, 70 beat/minute, average volume, no special character, vesselwall not felt, equal in both sides with intact peripheral pulsation.
  - **Mentality:** The patient is fully conscious, well oriented for time, placeand person. Average mood and memory. The patient is co-operative with average intelligence.
- **Local examination:**
- **Examination of Speech:** Normal.
- **Examination of Cranial Nerves:** Normal.
- **Examination of motor system :**

**Inspection**

- There is extension in both lower limbs (paraplegia in extension).
- No skeletal deformities, no trophic changes, no involuntary movement no muscle wasting.

**Examination of tone**

- There is normal tone in both upper limbs .
- Bilateral asymmetrical Hypertonia in lower limbs in the form of spasticity affecting antigravity muscles. It is more on Lt. lower limb (suggesting UMNL).

**Percussion**

- No fasciculation or myotonia.

**Examination of muscle power**

- There is normal muscle power in both upper limbs,
- Bilateral asymmetrical Weakness in lower limbs. It is distal more than proximal, abductors more than adductors, flexors more than extensors. It is more on Lt. lower limb.

**Coordination**

- Coordination cannot be examined on both lower limbs because of weakness.
- Normal coordination in both upper limbs confirmed by finger to nose, finger to finger, finger to doctor's finger in both eye opening and eye closure.

- ❖ **Reflexes**
  - There is normoreflexia in both upper limbs.
  - In Both lower limbs: hyperreflexia with +Ve pathological reflexes (Patellar, Adductor), no ankle or patellar clonus.
  - +ve Babniski on both sides.
  - Abdominal reflex : lost below the level of the umbilicus .
- ❖ **Sensory**
  - Superficial sensations: Sensory Level at T10.
  - Deep sensation: lost.
  - Cortical sensation : can't be examined in both lower limbs.
- ❖ **Back** Scar of exploration at the level of T7.
- ❖ **Gait** Scissoring gait.
- ❖ **No affection of other system examination**
- ❖ **Investigation :** Plain X-Ray , Myelography .
- ❖ **Treatment :** physiotherapy
- ❖ **Diagnosis :**
  - Organic Paraplegia Of Spinal Focal Compression Type. It's due to Extramedullary lesion at the level of T10. The patient is in the spastic stage (in Extension).
- ❖ **Why Paraplegia?** (UMNL Bilateral Δ ) : Affect both L.L. + Organic
  - Hypertonia in antigravity + spasticity.
  - Muscle Weakness: distal, progravity, abductors.
  - Hyperreflexia + pathological reflexes.
  - +Ve Babniski in both L.L.
  - Sensory Level at umbilicus.
  - No cranial nerve affection.
- ❖ **Why Spinal?**
  - Not Cortical: Rare, Need parasagittal lesion, no coma convulsion or aphasia.
  - Not brainstem: no affection of Resp. Center, no Cranial N. involvement, need lesion in midline to affect L.L which is medial and no bladder dysfunction.
- ❖ **Why Focal?:** Level .
- ❖ **Why Compression?:** No history of fever (inflammation), +Ve history of trauma.
- ❖ **Why Extra-medullary?**
  - Sensory Level.
  - Asymmetrical Power, reflexes.
  - Girdle pain.
  - No Sphincteric affection.
- ❖ **Why Level of T10?**
  - History: girdle pain, exploration at T7.
  - Sensory level at T10.
  - Abdominal Reflex lost at T10.
  - Vertebral :scar.
- ❖ **Why Spastic Stage:?**
- ❖ Hypertonia
- ❖ Hyperreflexia
- ❖ **Why Extension?** Patient's Position.
- ❖ **N.B.:**

A. **Inflammatory paraplegia differs from traumatic one in the following :**
  - Fever at the onset.
  - Regressive course.
  - Corticosteroids in TTT.

B. **Retention of urine may occur at the onset of acute lesions.**

## Peripheral neuropathy

❖ **Clinical picture of polyneuropathy:**

❖ **It will present by the 3 following manifestations in difference combinations:**

**A. Motor:**

1. **Weakness or paralysis of L.M.N. nature** (wasting, hypotonia, hyporeflexia . . .).
2. **The weakness and wasting are:**
   - ○ Bilateral and symmetrical.
   - ○ Affecting L.L. more than U.L.
   - ○ Affecting distal muscles more than proximal muscles.
   - ○ Affecting extensors more than flexors, affecting adductors more than abductors
3. The weakness in the extensors of the distal group of muscles leads to bilateral foot **drop** and wrist **drop**.
4. The ankle **reflex** is lost while the knee reflex is preserved.
5. The **cranial nerves** may be affected specially CN 3, 6, 7 and 10.
6. The **gait** is high steppage due to the foot drop.

**B. Sensory:**

1. **History:** pain and paraesthesia in the limbs, specially distally.
2. **Examination:**
   - ○ Superficial sensory impairment of the stock and glove nature.
   - ○ Deep sensory loss specially distally with absence of deep reflexes.

**C. Autonomic:**

1. **Vasomotor:** coldness and cyanosis of the limbs.
2. **Cutaneous:** loss of hair, brittle nails, trophic ulcers.

❖ N.B.: Regardless of the cause of the polyneuropathy, the clinical picture is essentially the same; variations depend on whether the motor, sensory or autonomic features predominate.

→ Clinical case of peripheral neuropathy :

| Diabetic peripheral neuropathy | Peroneal muscle atrophy |
|---|---|

## Diabetic peripheral neuropathy

❖ **Neurological complications of DM:**

1. **Peripheral neuropathy : stock & glove hypesthesia & deep sensory loss**
2. **Brain:**

| | | |
|---|---|---|
| ○ Cerebro-vascular accidents (stroke). | ○ Coma of different types | ○ Infection: fungal (rhinocerebral mucormycosis) |

3. **Brain stem:** Argyl Robertson pupil.
4. **Spinal Cord: (very very very rare)**
   - ○ Δ tract affection → Diabetic lateral Sclerosis { Planter reflex may be equivocal due to superficial sensory loss)
   - ○ Posterior column affection → sensory ataxia, Diabetic pseudotabes.
   - ○ Diabetic SCD.
5. **Root:** Diabetic Radiculopathy.
6. **Muscle: Diabetic amyotrophic:**
   - ○ Wasting, weakness of quadriceps muscle (proximal muscle!) due to femoral neuropathy.
   - ○ Revisable condition improve by diet , exercise , insulin therapy.

❖ **Effect of DM on other systems ( FOR MORE DETAILS SEE ENDOCRINOLOGY CHAPTER)**

| | |
|---|---|
| 1. **General :**<br>○ Pulse : Sinus tachycardia , may be absent peripheral pulsations<br>○ HTN , Postural hypotension<br>2. **CVS:**<br>○ IHD, HTN, Cardiomyopathy<br>3. **Chest :** TB follows diabetes like its shadow<br>4. **Abdomen :**Fatty liver, Diabetic nephropathy | 5. **Skin:**<br>○ Infection<br>○ Ischemic (vascular) effect.<br>○ Neuropathic (P.N) effect.<br>○ Necrobiosis lipoidica diabetocorum.<br>○ Bullosus diabetocorum.<br>○ Diabetic Dermopathy.<br>○ Effect of TTT : Lipodystrophy &Injection sites |

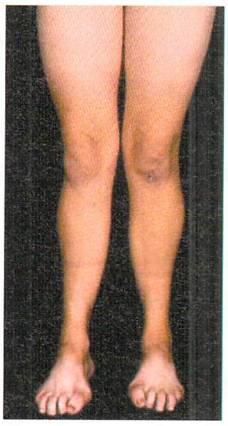
❖ **Autonomic neuropathy in DM:**

→ **Pathogenesis:** Sorbitol Pathway

→ **Symptoms & signs:**

1. **Cardiovascular system:**
   - ○ Absent respiratory sinus arrhythmias.
   - ○ Persistent sinus tachycardia (examine with pulse & ask about palpitation)
   - ○ Painless myocardial infarction.
   - ○ Postural hypotension (examine with vital sign)
2. **Genitourinary:**
   - ○ Bladder disturbances (incontinence → ask for it)
   - ○ Impotence (psychic and organic ask for it)
3. **Gustatory sweating** (Marked sweating specially with meals → ask for it)
4. **Gastrointestinal:**
   - ○ Gastroparesis diabeticorum (ask for dyspepsia).
   - ○ Diabetic enteropathy (ask for nocturnal watery diarrhea and constipation).

## Peroneal muscle atrophy



❖ **Incidence :**

- ○ Positive family history (herido-familial)
- ○ Appears at 1st at 2nd decade.
- ○ Male > female

❖ **Clinical picture:**

A. **Generally:**

1. Bilateral , symmetrical.
2. Gradual onset.
3. Very very very slowly progressive course.
4. Appears in LL→ then progress to U.L.

(لكن بعد كتير جداً علشان كده تلاقي ال LL أكتر من ال UL في كل حاجة )

B. **Local manifestations:**

1. **Skeletal deformity.**
   - ○ Pes cavus, talipes equinus, Hammer toe, ± Kypho-scoliosis.
2. **Sensory changes:**
   - ○ Superficial sensation (stock, glove nature).
   - ○ Deep sensation (lost all deep sensation).
3. **Motor changes:**

| | | |
|---|---|---|
| → **Muscle state:** Wasting (marked, bilateral, symmetrical) which may lead to:<br>○ Pes cavus<br>○ Start in lower limbs in the peronei muscles then anterior tibial group then ascend to involve the muscles of lower 1/3 of thigh resulting in **Inverted Champaign bottle appearance.** | → **Trophic changes:**<br>○ Loss of hair.<br>○ Brittling of nails lusterless.<br>→ **Posture:**<br>○ Foot drop (gait)<br>○ Wrist drop.<br>→ **Muscle tone:**<br>○ Hypotonia (frog position) | ○ **Power:**<br>○ Mild disturbance of motor power i.e. Discrepancy between degree of wasting, degree of weakness<br>○ **Reflexes:**<br>○ Lost ankle, preserved knee (early). |

❖ **Associated signs:-**

- ○ Degeneration of cerebellum → Friedreich's ataxia.
- ○ Degeneration of AHCs → fasciculations.
- ○ Degeneration of Δ Tract → + ve Babinski.

ال Babinski ممكن يكون موجود فعلاً وما يبانش لو عنده skeletal deformities of big toe

**N.B All data of C/P are a must ± Association**

❖ **What are other Nomenclature of this disease ?** هام ممكن تتسأل السؤال ده

1. Peroneal muscle atrophy.
2. Charcot-Marie-Tooth disease. اسم ثلاث علماء اشتركوا في وصفه
3. Hereditary Sensory Motor Neuropathy type I (HSMNI).

## Diabetic peripheral neuropathy

- **Personal history :….**
- **Complaint:** Loss of sensation in both hands and feet of 15 years duration.
- **HPI:**
  - The condition started 15 years ago by nocturnal **burning pain** associated with **tingling, numbness** started in both feet then progressed, one year later, to involve both hands then the patient developed gradual **loss of sensation** in both hands and feet, and he felt as if he **walked on cotton**
  - 4 years later, the patient experienced **weakness** associated with **flaccidity, falling of hair, brittle nails** with no **wasting** or **twitches.** This weakness started in L.Ls then progressed, one year later, to involve both ULs. It's more in distal than proximal muscles, in extensor more than flexor muscles, in adductor more than abductor muscles. The patient also suffers from **unsteadiness during eye closure** with no involuntary movements.
  - The condition was associated with **diminution of vision, visual field defects, disturbance of color vision, ptosis** in both eyes for which the patient **was** investigated and treated by laser photocoagulation more than once. The patient **can't close his eyes firmly, with accumulation of the food behind both cheeks, No** symptoms of other cranial nerve affection
  - **The patient has organic impotence with lost morning erection with no history of drugs known to cause erectile dysfunction.**
  - The patient developed **unsteadiness during standing with palpitation, nocturnal diarrhea, gustatory sweating and dyspepsia**
  - No symptoms of increased **I.C.T.,** No **speech** disturbance., **No symptoms suggestive of other system affection**
- **Past history:**
  - There is past history of **D.M** started 20 years ago manifested by polyuria, polydypsia, polyphagia. The patient is on insulin treatment and his blood sugar is out of control.
  - There is past history of HTN started 15 years ago manifested by headache, blurred vision. The patient is on capoten and his hypertension is not controlled.
  - Appendectomy operation was done at the age of 20 years.
  - No history of other drug intake.
- **Family history:** No similar condition in family, No consanguinity. No common disease in family
- **General examination**
  - **Temperature: 37.2° c.**
  - **Bl. Pressure:** 140/80 (Recumbent position), 100/60 (standing position).
  - **Pulse:** regular, 110 beat/minute, average volume, no special character, vessel wall not felt, equal in both sides with absent dorsalis pedis, anterior and posterior tibial and popliteal pulsation with intact femoral, radial, brachial and axillary pulsation.
  - **Mentality:** The patient is fully conscious, well oriented for time, place and person. Average mood and memory. The patient is co-operative with average intelligence.
  - **Head:** Examine for Retinopathy, teeth (Artificial teeth).
  - **LL:** Trophic ulcer, diabetic dermopathy.
- **Local examination :**
- **Sensory :**
- **Superficial sensations**: above knee and elbow level stock and glove anesthesia. Circumferential comparison must be done to exclude diabetic radiculopathy.
- **Deep sensation:**
  - Joint sense lost on both sides.
  - Vibration sense lost at level of peripheral nerve (medial malleolus, radial styloid process) with intact vibration sense at the level of posterior column (ASIS, clavicle).
  - Muscle sense lost (Calf muscles).
  - Lost nerve sense (Ulnar and lateral popliteal nerves).
  - +Ve Romberg's test.
- **Cortical sensation:** can't be examined due to loss of superficial sensation.
- **Examination of speech : normal**
- **Examination of cranial nerve:**

- **Optic Nerve** is affected in the form of: diminution of visual acuity (Rt. eye: can count fingers at one meter, Lt. eye: blind), Tubular visual field defect.
- **Ocular nerves**
- **Inspection:** bilateral ptosis (thumb test » can't elevate his eye lids), pupils are dilated and irreactive to light or accommodation with no squint.
- **Power:** loss of eyeball movements in all direction denoting paralysis of recti and oblique muscles of the eye.
- **N.B:** nystagmus and conjugate eye movements can't be examined because of loss of eye movements on examining each eye separately.
- **Reflexes:** absent light and accommodation reflexes.
- **Facial nerve**
- **Inspection:** symmetrical forehead, obliterated nasolabial folds on both sides with no tearing, no drippling of salive, no mouth deviation
- **Power:** patient can’t close his eyes firmly, can't elevate his eye brows, can't whistle, can't show his teeth, can't blow his cheeks
- **Reflexes:** absent glabellar reflex→ bilateral LMNL

- **Examination of motor system :**
- **Inspection**
- There is wrist and ankle drop, trophic ulcer in L.L, loss of hair and brittle nail in U.L, L.L.
- No muscle wasting, no skeletal deformities, no involuntary movement.
- **Examination of tone**
    - Bilateral symmetrical hypotonia in both upper and lower limbs
- **Percussion:** No fasciculation or myotonia.
- **Examination of muscle power**
- Bilateral symmetrical Weakness in both LIMBS but it is in LL more than UL, It is distal more than proximal, extensors more than flexors., in adductors more than abductors
- Abdominal muscles: weakness may be attributed to trunkal neuropathy or related to myopathy as the patient gives history of thyrotoxicosis.
- **Coordination**
- Cannot be examined on both upper and lower limbs because of weakness.

- **Reflexes**
- **Deep reflexes:** Areflexia in both upper and lower limbs.
- **Superficial reflexes:** lost plantar reflex in both L.L., lost abdominal reflex (trunkal neuropathy).

    → **N.B.:** lost planter reflex may be due to loss on sensation on the sole of the foot, LMNL at SI, weakness in muscles of the big toe or skeletal deformities in big toe).

- **Back** No deformity, no swelling, no scars
- **Gait** stamping (may be high steppage)
- **Other system examination : search for autonomic neuropathy. See before**
- **Investigation**
- **For diabetes:** Bl. Sugar level with HBAIC, ECG, RFTs, blood lipid profile (cholesterol, HDL, LDL, TG)
- **For P.N:** Nerve Conduction velocity.
- **Treatment :**
    - **For diabetes:** tight control.
    - **For the P.N.:** Tegretol, gabapentin, vitamins, aldose reductase inhibitor (disappointing results).
- **Diagnosis Diabetic Peripheral Neuropathy**
- **N.B.s:**

1. Lost **abdominal reflex** in this case may be due to trunkal neuropathy.
2. **Abdominal muscles** power can't be examined by resistance because of proximal myopathy → the patient has history of Thyrotoxicosis.
3. Lost **knee reflex**→ not related to high stock level as lost superficial sensation has nothing to do with deep reflexes but is related to lost deep sensation at the level of the knee (evidenced by lost vibration sense at the knee and may be due to amyotrophy due to femoral neuropathy).
4. No **muscle wasting** → mainly sensory

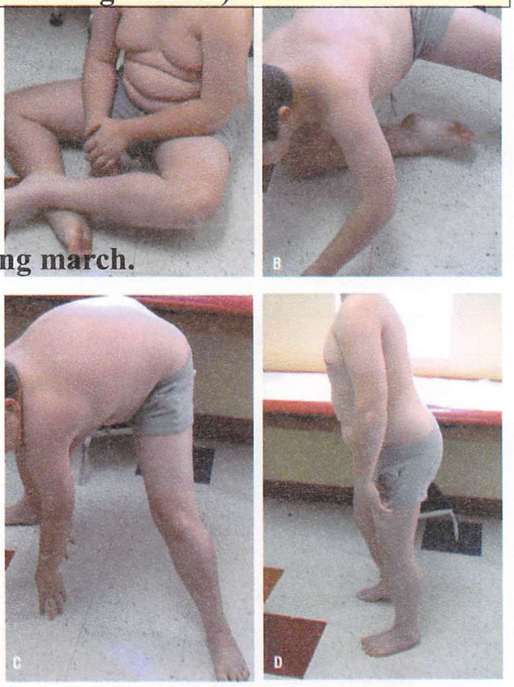
# Myopathy

- ❖ Character :
  1. Systemic degeneration :
     - ○ Bilateral , symmetrical
     - ○ Gradual onset, progressive course
  2. Triad of : Weakness + wasting + hypotonia
- ○ Distribution of weakness in myopathy : هام هام هام, bilateral, symmetrical :
  - ○ Proximal more than distal
  - ○ Adductors more than abductors
  - ○ Extensors more than flexors
  3. No sensory affection, fasciculations or sphincteric disturbances

❖ Signs due to weakness of the proximal muscles :

| ❖ Affected muscle | ❖ Effect |
|---|---|
| ▪ Serratus anterior and lower fibers of trapezius | ▪ Winging of the scapulae |
| ▪ Weakness of the extensor muscles of the trunk | ▪ Exaggerated lumbar lordosis |
| ▪ Weakness of the abdominal muscles. | ▪ Pot-belly abdomen |
| ▪ Weakness of the gluteus medius & minimus (abductors of the hip). | ▪ Waddling gait , wide base gait, pelvis is tilting during walking |
| ▪ Weakness of gluteus maximus | ▪ Gower's sign Characteristic manner in getting up from the floor (climbing himself) |

- N.B.: other causes of waddling gait : hip dislocation & congenital



❖ How to reach diagnosis ?

- ○ Triad of weakness, wasting, hypotonia signifies that our case is muscle disease either: myopathy, myasthenia, myotonia :

1) Myasthenia can be excluded by absence of diurnal variation and descending march.

- Test for fatigability to exclude myasthenia : ask patient to :
  - Look up for 1 min. : ptosis will occur

2) Myotonia can be excluded by absence of myotonic phenomenon.
3) So the case is most propably myopathy.

❖ Causes of myopathy:

- ○ Hereditary (Progressive muscular dystrophy).
- ○ Trauma → history
- ○ Drugs e.g. corticosteroids, Alcohol → History
- ○ Endocrinal: Acromegaly, Cushing, myxedema, thyrotoxicosis → History
- ○ Inflammation → fever, tenderness + skin changes.
- ○ So our case is most probably hereditary:

❖ Hereditary myopthay may be either: pelvic girdle or shoulder girdle, distal type of Gower, ocular type

- ○ Ocular type is excluded by intact ocular muscles
- ○ Distal type of Gower is excluded by examination if proximal muscle affected more than distal

Then ask the patient when did the weakness start:

- ○ If in LL first:

Pelvic girdle type:

| | 1. Pesudohypertrophy | | 2. Atrophic |
|---|---|---|---|
| Type | Duchenne type | Becker type | Leyden-Mobius type |
| Age of onset | ○ 1st decade | ○ 2nd decade | |
| Course | ○ Malignant (rapidly progressive) | ○ Benign (slowly progressive) | |
| Association | ○ Skeletal deformities e.g. Pes cavus, talipes equinus<br>○ ECG changes | ○ Absent | |

- If start in UL first:

Shoulder girdle type

| A. Fascio-scapulo-humeral type | B. Scapulo-humeral type |
|---|---|
| ▪ Landouzy & Dejerine type | ▪ Erb type |
| ▪ Bilateral weakness of facial muscles | ▪ Facial muscles are free |

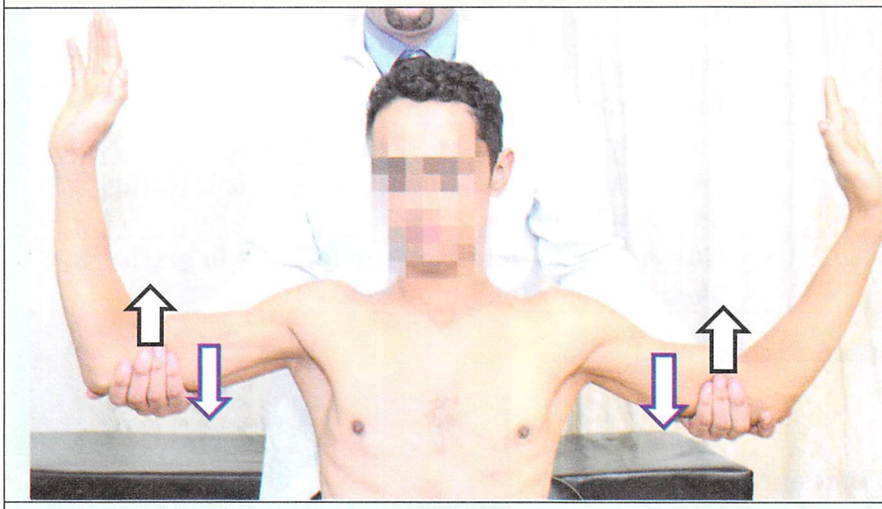
### ❖ Examination of muscles of myopathy :

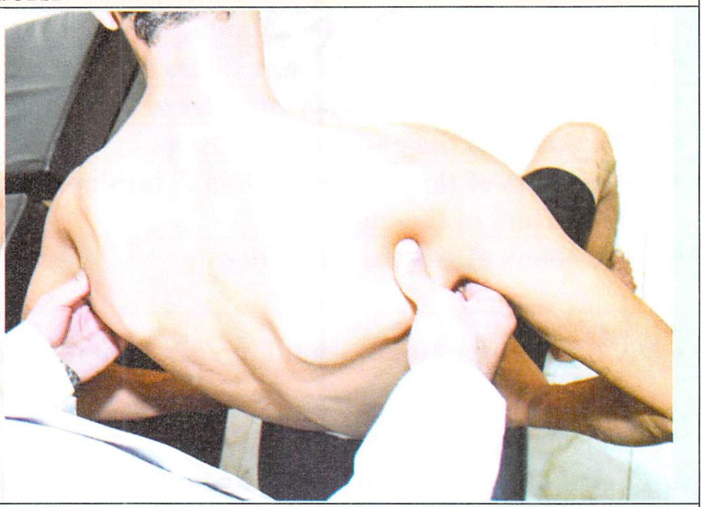
- In myopathy, there is affection of some muscles and sparing of others (selective sparing or selectivity)

## ❖ Special muscles test for myopathy

## I. Affected muscles

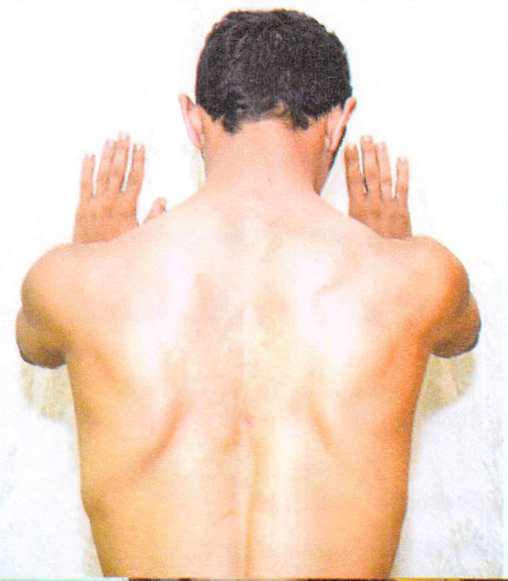
### ❖ Latismus dorsi

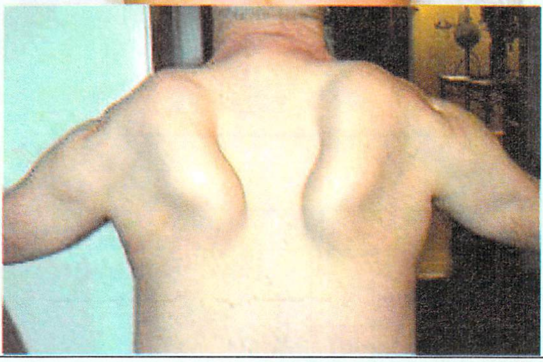




- مسئولة عن حركة شد الجرس
- اقف من ورا العيان وخليه يعمل زاويه 90° بذراعه للجنب وحط ايدك تحت كوعه وقول حاول تنزل دراعك
- طريقة أخرى : العيان يحط إيده في وسطه ونطلب منه يكح ونحس ال posterior axillary fold

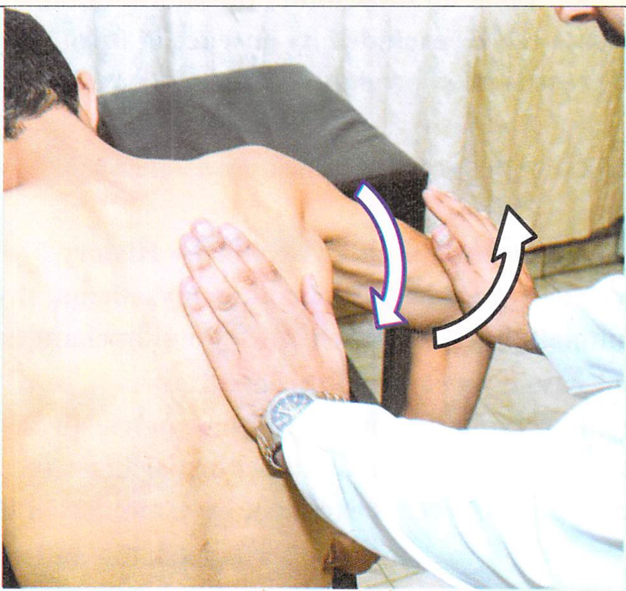
### ❖ Serratus anterior

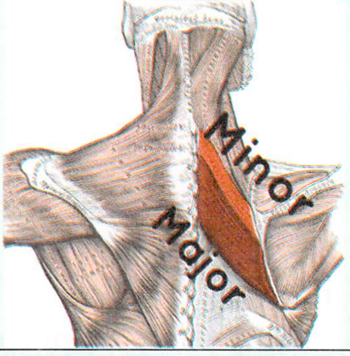




- مسئولة عن عمل support to scapula
- مش هتعرف تشوف قوتها بس ممكن تشوف تأثيرها
- قول للعيان يزق الحيطة وبص على ظهره winging of scapula

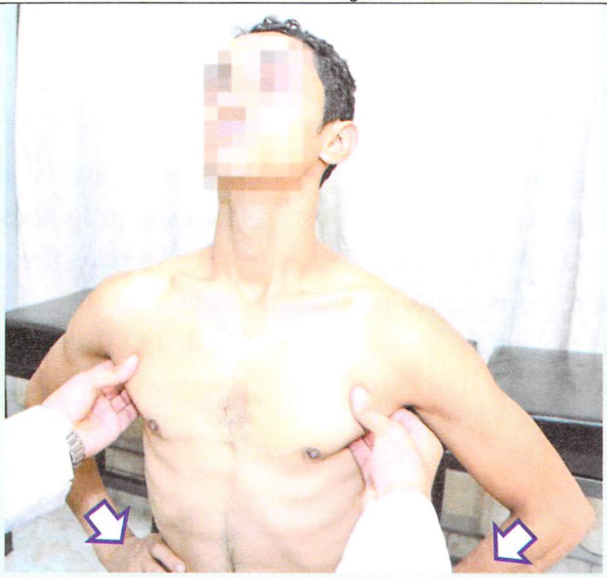
### ❖ Rhomboids





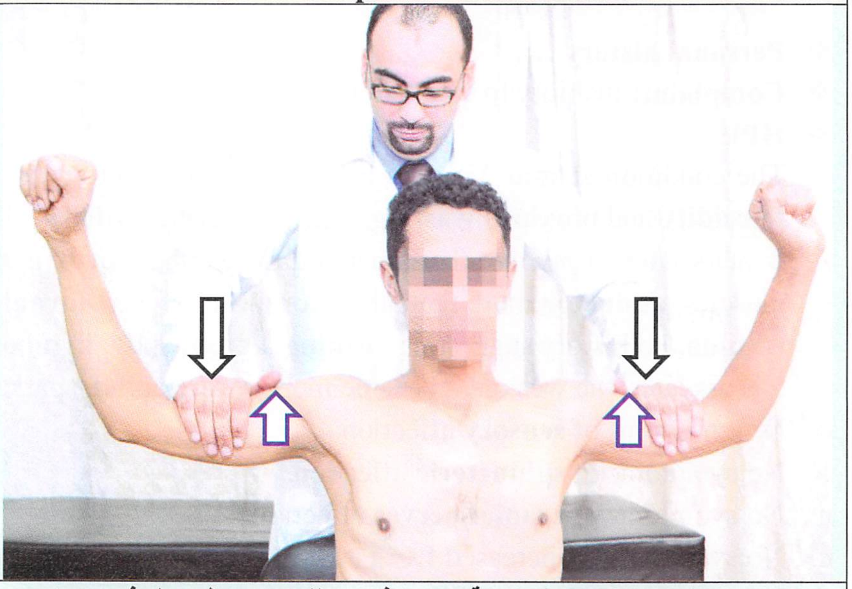
- العيان يحط ايده في وسط ويرجع دراعه للخلف ضد مقاومة ايدك ونحس العضلة

- ❖ **Pectoralis major : sternal head**



- العيان يحط ايده في وسطه ويزق ايديه في وسطه جامد ونحس العضلة

- ❖ **Trapezius : lower fibers**

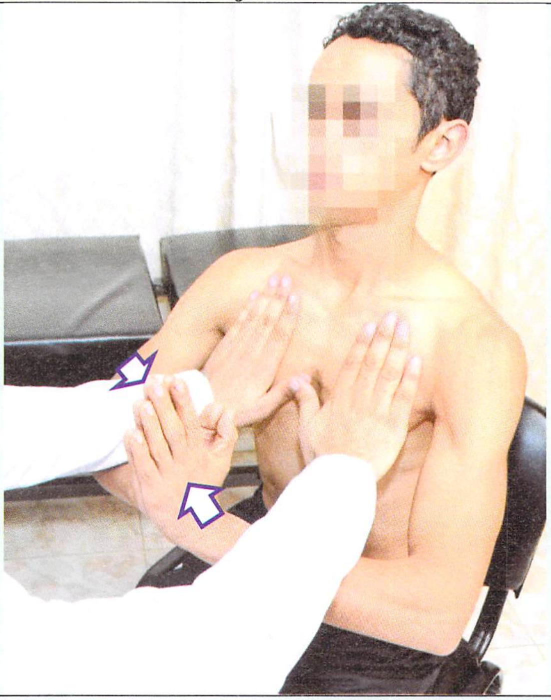


- من ورا العيان خليه يعمل زاوية 90 ° بذراعه للجنب وحط ايديك فوق دراعه وقوله حاول ترفع دارعك

- ❖ **Abdominal muscles : Beevor's sign: see before**

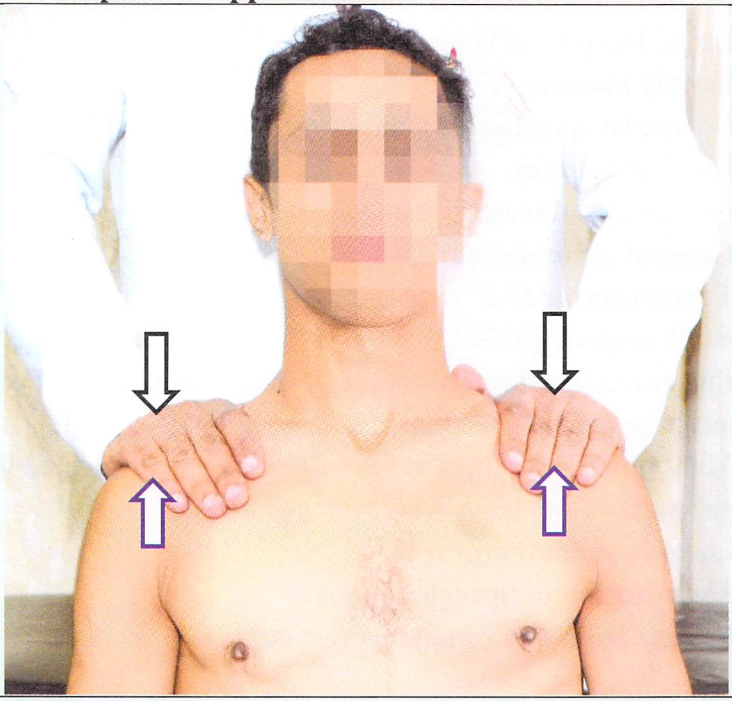
## II. Spared muscles :

- ❖ **Pectoralis major : clavicular head**



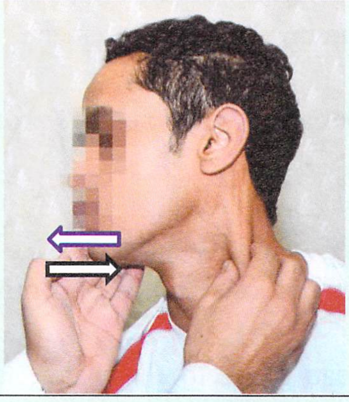
- العيان يرفع دراعه للأمام ويتني دراعه ويحاول يشبكهم ويزق ايديه في بعض وحس العضلة

- ❖ **Trapezius : upper fibers**



- من ورا العيان حط إيديك على كتافه وقوله ارفع كتافك ... متخلنيش أنزلهم

- ❖ **Sternomastoid :**



❖ من قدام العيان :

1. كل عضلة لوحدها: ( كل عضلة تزق الرقبة الناحية العكسية)
   - ○ حط إيدك على جنب فكه وقوله زق إيدي وحس العضلة الناحية التانية
   - ○ حط ايدك التانيه بنفس الطريقة وحس العضلة الأخرى
2. العضلتين مع بعض: ( العضلتين مع بعض يزقوا الرقبة لتحت)
   - ○ حط إيدك تحت ذقنه وقوله زق إيدي وشوفهم وحسهم الاتنين سوا

# Myopathy, Becker variety

- **Personal history ….**
- **Complaint:** inability to stand up from sitting position, 20 years duration..
- **HPI:**
  - The condition started 25 years ago by gradual onset and slowly progressive course of **weakness** associated with **flaccidity** and proximal **wasting**, with no **muscle twitches**. This weakness affected both lower limbs and progressed 2 years later to involve the upper limbs. It affects **proximal** more than distal muscles, **extensor** more than flexor muscles, **adductor** more than abductor muscles. No **diurnal variation**, no **descending march course,** no **fever,** no **trauma**, no history suggesting **cushing, acromegaly, hypo or hyperthyroidism** with no history of **drug intake.**
  - 5 years later, the weakness became more **severe** and the patient was unable to **stand up from sitting position** at all.
  - No symptoms of **sensory** affection.
  - No symptoms of **sphincteric** affection.
  - No symptoms of **cranial nerves** affection.
  - No symptoms of increased **I.C.T.**
  - No symptoms of **speech** disorders.
  - No symptoms suggesting **pulmonary or systemic congestion** or any other symptoms suggesting **CVS** affection.
  - No symptoms suggesting other **system** affection.
- **Past history:**
  - No past history of drugs known to cause myopathy (e.g. Corticosteroids, Chloroquine,…).
  - No past history of D.M, HPN, or operations.
- **Family history:**
  - No similar condition in family.
  - No consanguinity.
  - No common disease in family
- **General examination:**
  - **Temperature:** 37.2° c.
  - **Bl. Pressure:** 130/70.
  - **Pulse:** regular, 70 beat/minute, average volume, no special character, vessel wall not felt, equal in both sides with intact peripheral pulsation.
  - **Mentality:** The patient is fully conscious, well oriented for time, place and person. Average mood and memory. The patient is co-operative with average intelligence.
- **Local examination:**
- **Examination of Speech:** Normal.
- **Examination of Cranial Nerves:** Normal. (special care to exam of ocular group and facial nerve ).

- **Examination of motor system :**
  - **Inspection**
    - Bilateral symmetrical Proximal wasting in upper & lower limbs with pseudohypertrophy in the calf muscles.
    - No skeletal deformities, no trophic changes, no involuntary movement.
  - **Examination of tone**
    - Bilateral symmetrical Hypotonia in both upper and lower limbs. It's proximal more than distal.
  - **Percussion**
    - No fasciculation or myotonia.
  - **Examination of muscle power**
    - Bilateral symmetrical Weakness in both upper and lower limbs. It is proximal more than distal, adductors more than abductors, extensors more than flexors.
    - Serratus anterior, Latismus Dorsi, Lower head of pectoralis major, lower fibers of trapezius are affected while Sternomastoid, Upper fibers of trapezius, Upper head of pectoralis major are spared.
    - Power of abdominal muscles → Beevor's sign.
  - **Coordination**
    - Coordination cannot be examined in both upper and lower limbs because of weakness.

❖ **Reflexes**

- Bilateral areflexia in upper and lower limbs
- Babinski : plantar flexion on both sides (normal).
- Abdominal reflex : diminished below the level of the umbilicus .

❖ **Sensory**

- Superficial sensations: intact.
- Deep sensation: intact.
- Cortical sensation : intact.

❖ **Back** Exaggerated lumbar lordosis.

❖ **Gait** waddling gait.

❖ **No affection of other system examination**

❖ **Investigation :** EMG, Muscle Biopsy, enzymes .

❖ **Diagnosis :**

❖ **Muscle disease, Progressive muscular dystrophy, Pseudohypertrophic pelvic girdle type, Becker variety.**

| | |
|---|---|
| ▪ **Wasting, Weakness, Hypotonia, Areflexia** | ✓ **So the lesion is LMNL** |
| ▪ **Not A.H.C: No Fasciculation.**<br>▪ **Not Peripheral Nerve: No sensory or sphincteric disturbance.** | ✓ **So the case is Muscle disease** |
| ▪ **Not myoneural junction: No diurnal variation, no descending march course.**<br>▪ **Not Myotonia:**<br>o **No Mechanical Myotonia, No Voluntary Myotonia**<br>o **Sternomastoid Muscle is spared.** | ✓ **So the case is myopathy** |
| ▪ **Not Ocular: ocular muscles are intact.**<br>▪ **Not distal type of Gower: distal muscle are less affected that proximal.** | ✓ **So the case is either pelvic or shoulder girdle** |
| ▪ **Pelvic Girdle:**<br>o **LL > UL.**<br>o **Beevor's Sign.**<br>o **Diminished abdominal reflex below the level of umbilicus.** | ✓ **So the case is either atrophic or pseudohypertrophic** |
| ▪ **Pseudo-hypertrophy: calf muscles are hypertrophied but weak.**<br>o **To make sure ask for EMG and muscle biopsy.** | ✓ **So the case is either**<br>✓ **Duchenne or Becker** |
| ▪ **Becker**<br>o **3rd Decade.**<br>o **Slowly progressive.**<br>o **No skeletal deformity.**<br>o **No C.V.S affection.** | |

❖ **Other case scenario :**

1. Wasting, weakness & hypotonia are more in **upper** limb.
2. **Facial** muscles are affected.

→ So the case is shoulder girdle type, **facio-scapulo-humeral** variety (Landouzy and Dejerren's)

# Ataxia

❖ **Definition :** incoordination of voluntary motor activity in the absence of motor weakness with or without disequilibrium

❖ **Types :**

| A. Cerebellar | B. Sensory | C. Vestibular | D. Mixed |
|---|---|---|---|

- لو إختبارات ال co-ordination ← +ve ← تشك أن الحالة ataxia
- لازم تتأكد عن طريق اختبارات ال cerebellar ataxia
- لازم تعرف المكونات علشان تعرف النوع , هل هي Friedriech ولا Marie ؟

I. **Cerebellar ataxia:** Signs of incoordination : when eye both opened & closed: see before

| Causes of cerebellar ataxia | | |
|---|---|---|
| 1. Focal | 2. Systemic degeneration (herido-familial ataxia) | 1. Disseminated e.g. DS |

❖ **Herido-familial ataxia : lesion must affect at least cerebellum & pyramidal tract**

| | Marie's ataxia | Friedriech's ataxia |
|---|---|---|
| ▪ Ataxia | ○ Pure cerebellar ataxia | ○ Mixed ataxia |
| ▪ Incidence | ○ The simplest form<br>○ Male > female | ○ The commonest form<br>○ Female > male |
| ▪ Family history | ○ Negative | ○ Positive (autosomal recessive) |
| ▪ Age of onset | ○ 2nd and 3rd decade of life | ○ 1st decade of life |
| ▪ Pathology | ○ Degeneration of 2 areas in spinal cord | ○ Degeneration of 4 areas in spinal cord |
| ▪ Cerebellar tract | ○ Neocerebellar affection with characters of cerebellar ataxia<br>○ zigzag gait | ○ Archicerebellum affection with Characters of cerebellar ataxia<br>○ Standing : swaying (trunkal ataxia)<br>○ Walking : Wide base "drunken" or staggering gait |
| ▪ Δ tract | ○ Marked (+ve Babinski sign) | ○ Affected (+ve Babinski sign) |
| ▪ PN | ○ Not affected | ○ Affected; stock & glove hyposthesia |
| ▪ Posterior column | ○ Not affected | ○ Affected (sensory ataxia, decrease deep sensation; movement , position, vibration) |
| ▪ Speech | ○ Staccato speech or Slurred speech | ○ Staccato speech or scanning speech |
| ▪ Sensation | ○ Preserved both | ○ Impaired superficial sensation<br>○ Impaired deep sensation (sensory ataxia) |
| ▪ Tone | ○ Spasticity (marked pyramidal lesion) | ○ Flaccidity (due to associated peripheral neuritis, posterior column, cerebellar lesion) |
| ▪ Deep reflexes | ○ Increased (pyramidal lesion) | ○ Diminished or lost<br>○ Lost ankle reflex due to peripheral neuropathy<br>○ Preserved or exaggerated knee reflex due to pyramidal tract lesion |
| ▪ Associated finding | ○ Mental impairment<br>○ Ocular never palsies<br>○ Extra pyramidal manifestations e.g. fanning of other toes during planter reflex | ○ Skeletal deformities (pes cavus + kyhposcoliosis)<br>○ Congenital heart diseases & ECG changes, cardiomyopathy<br>○ Peroneal muscle atrophy<br>○ Abnormal GIT or DM |
| ▪ Treatment | Antioxidants as co-enzyme Q, new groups (mitoquinone, idebenone) | |

# Friedreich's ataxia

- **Personal history :….**
- **Complaint:** staggering gait since he was 4 years old.
- **HPI:**

- The condition started since he was 4 years old by gradual onset and progressive course of **gait disturbances** , **difficulties in speech**, **kinetic tremors** in both hands and feet with **unsteadiness during eye closure**.
- 6 months later, the patient experienced **weakness** associated with **flaccidity** and **falling of hair** with **brittling of nails** with no twitches or wasting. This weakness affected both LLs. it is in distal more than proximal muscles, in flexor more than extensor muscles, in abductor more than adductor muscles.
- The condition was associated with **loss of sensation** in both hands and feet and and the patient felt as if **he walked on cotton**.
- No symptoms suggesting **cranial nerve** affection.
- No symptoms suggesting increased **I.C.T.** or **sphincteric** disturbances.
- No symptoms suggesting **pulmonary or systemic congestion** or any other symptoms suggesting **CVS** system affection.
- No symptoms suggesting other **system** affection.

- **Past history:**

- No History of D.M, HTN, drugs or operations.

- **Family history:**

- +Ve family history (his sister suffers from the same condition).
- +Ve consanguinity: 2$^{nd}$ degree.
- No common disease in family.

- **General examination**
  - **Temperature:** 37.2° c.
  - **Bl. Pressure:** 120/80.
  - **Pulse:** regular, 70 beat/minute, average volume, no special character, vessel wall not felt, equal in both sides with absent peripheral pulsation.
  - **Mentality:** The patient is fully conscious, well oriented for time, place and person. Average mood and memory. The patient is co-operative with average intelligence.
  - **Head & neck:**
  - Head nodding,
  - Bilateral horizontal spontaneous monophasic nystagmus.
  - **UL** : intentional kinetic tremors on doing tests of coordination, hypotonia.
  - **LL**: trophic changes ,weakness of pyramidal tract distribution, hypotonia, lost ankle with exaggerated knee reflexes.
- **Local examination:**
- **Examination of Speech:** Scanning speech.
- **Examination of Cranial Nerves:** Normal.
- **Examination of motor system :**

**Inspection**

- loss of hair and brittle nails in both L.L.
- No muscle wasting, no skeletal deformities, no involuntary movement, no specific posture.

**Examination of tone**

- Bilateral symmetrical hypotonia in both upper and lower limbs.

**Percussion :** No fasciculation or myotonia.

**Examination of muscle power**

- Normal power in both upper limbs.
- Bilateral symmetrical Weakness in both lower limbs. It is in distal more than proximal muscles, in abductor more than abductor muscles, in flexor more than extensor muscles → (weakness of UMNL).
- Abdominal muscles → normal power.

**Coordination**

- Coordination cannot be examined in both lower limbs because of weakness.
- In both Upper limbs:
- intentional kinetic tremors in eye proved by finger to nose test, finger to finger test and finger to doctor's finger test.
- Intentional kinetic tremors with hypermetria in eye closure proved by finger to nose test and finger to finger test.
- Loss of buttoning and unbuttoning.
- Adiadokokinesia.
- +Ve rebound phenomenon.
- Head nodding
- Scanning speech
- Bilateral, monophasic, horizontal, spontaneous nystagmus (not cerebellar nystagmus).
- No titubation of the trunk

**Reflexes**

- **Deep reflexes**:
    - In both upper limbs: normoreflexia.
    - In both lower limbs: lost ankle (P.N) and exaggerated knee (ΔT lesion) with +ve patellar, adductor reflex.
- **Superficial reflexes**:
    - +Ve Babinski in both L.L.
    - Abdominal reflexes: preserved.

**Sensory**

- **Superficial sensations**: below knee and elbow stock and glove anesthesia .
- **Deep sensation**:
    - Joint sense lost on both sides.
    - Vibration sense lost at level of medial malleolus, ASIS (post column.+ P.N.).
    - Muscle sense lost, nerve sense lost.
    - +Ve Romberg's test.
- **Cortical sensation** : can't be examined due to loss of superficial sensation.

**Back** Normal (No deformities, no pigmentation).

**Gait** staggering gait.

**Other system examination :**

- Focus on CVS exam as Friedreich's ataxia may be associated with cardiomyopathy

**Investigation :**

- For the cause: imaging (C.T & MRI).
    - For association: ECG, Echo, CXR, Bl. glucose.

**Diagnosis : A case of heridofamilial ataxia for D.D, most probably Friedreich's ataxia**

# Marie's ataxia

- **Personal history :….**
- **Complaint:** Inability to reach the mouth with spoon properly during eating, 32 years duration.
- **HPI:**
  - The condition started since he was 32 years ago by symptoms of in-coordination in the form of **kinetic tremors in both hands and feet** as the patient can't reach his mouth properly with the spoon during eating .This tremor was associated with **staggering gait**, **difficult speech**, with **difficulty to hold urine when he feels the desire**.
  - No symptoms suggesting **Motor** affection.
  - No symptoms suggesting **Sensory** affection.
  - No symptoms suggesting **cranial nerve** affection.
  - No symptoms suggesting increased **I.C.T**. or **sphincteric** disturbances.
  - No symptoms suggesting other **system** affection.
- **Past history:**
- No History of D.M, HTN, drugs or operations.
- **Family history:**
- No family history of similar conditions.
- No consanguinity.
- No common disease in family.
- **General examination**
- **Temperature:** 37.2° c.
- **Bl. Pressure:** 120/70.
- **Pulse:** regular, 70 beat/minute, average volume, no special character, vessel wall not felt, equal in both sides with absent peripheral pulsation.
- **Mentality:** The patient is fully conscious, well oriented for time, place and person. Average mood and memory. The patient is co-operative with average intelligence.
- **Head :** Bilateral biphasic horizontal fixation nystagmus with its direction always towards point of fixation, stacatto speech with no head nodding.
- **UL:** intention kinetic tremors on doing tests of coordination, hypotonia.
- **LL:** side to side movement on doing heel to knee test, hypotonia.
- **Local examination:**
- **Examination of Speech:** Stacatto speech.
- **Examination of Cranial Nerves:** Bilateral biphasic horizontal fixation nystagmus with its direction always towards point of fixation
- **Examination of motor system :**
- **Inspection**
- No muscle wasting, no skeletal deformities, no involuntary movement, no specific posture, no trophic changes.
- **Examination of tone**
- Bilateral symmetrical hypotonia in both upper and lower limbs.
- **Percussion**
- No fasciculation or myotonia.
- **Examination of muscle power**
- Normal power in both upper and lower limbs with normal power in abdominal muscles.

**Coordination**

- In Upper limbs:
  - intentional kinetic tremors proved by finger to nose test, finger to finger test, finger to doctor's finger test during eye opening and finger to finger test, finger to nose test during eye closure.
- In Lower limbs:
  - There is side to side movement in heel to knee test during eye opening and closure.
- Loss of buttoning and unbuttoning.
- Dysdiadokokinesia.
- +Ve rebound phenomenon.
- Lost heel to toes gait.
- Head nodding, No titubation of trunk.
- Bilateral biphasic horizontal fixation nystagmus with its direction always towards point of fixation.
- Stacatto speech.
- +ve Romberg's test .

**Reflexes**

- **Deep reflexes**: Bilateral symmetrical normoreflexia in ULs and LLs.
- **Superficial reflexes**: +ve Babiniski i.e dorsiflexion in big toe (pyramidal tract lesion) with fanning of other toes and withdrawal in both L.L. (Extra ΔT lesion).

**Sensory:** All sensations (Superficial, deep, cortical) are intact.

**Back** Normal (No deformities, no pigmentation, no swelling ,no scars).

**Gait** Zigzag gait.

**No affection in other system examination**

**Diagnosis : A case of heridofamilial ataxia, most probably Marie's ataxia.**

# Motor neuron disease; MND

❖ **Definition :** systemic degenerative disease with unknown cause, of gradual onset & progressive course affecting motor system only with intact sensation , there is degeneration of UMN or LMN or both.

❖ **Types :**

| A. Anatomical classification | | | B. Functional classification | | |
|---|---|---|---|---|---|
| ○ Spinal type: spinal cord lesion | ○ Bulbar type: brainstem lesion | ○ Spino-bulbar type: mixed lesion | ○ Pure UMNL | ○ Pure LMNL | ○ Mixed type |

❖ **Clinically :**

1. **Pure UMN affection: Bilateral pyramidal tract affection :**

| A. Spinal MND | B. Bulbar MND |
|---|---|
| ○ Lesion in spinal cord | ○ Lesion in the brain stem or the cerebral hemisphere |
| ↳ Primary lateral sclerosis | ↳ Pseudo bulbar palsy |
| ▪ Degeneration of corticospinal tract, bilateral sign & symptoms of UMNL (paralysis, hypertonia, hyperreflexia , no or mild wasting , no trophic changes ) resulting in :<br>➢ Spastic Paraplegia (LL) : if the lesion below cervical region or<br>➢ Spastic Quadriplegia (4 limbs) : if the lesion above cervical region | ▪ Degeneration of corticobulbar tract, results in clinically tetrad of : dysphagia , dysarthria, dysphonia (hoarseness of voice), nasal regurgitation, other clinical picture depend on the site of the lesion:<br>1. Above medulla:<br>➢ Spastic Quadriplegia with UMNL signs in UL & LL<br>➢ Pseudo bulbar palsy (Exaggerated palatal, pharyngeal reflexes)<br>2. Above pons:<br>➢ As above medulla<br>➢ Appearance of Jaw reflex<br>3. Above midbrain:<br>➢ As above pons<br>➢ Emotional & mood changes |
| C. Spinal- bulbar MND: spinal MND & bulbar palsy | |

2. **Pure LMN affection:**

| A. Spinal MND | B. Bulbar MND |
|---|---|
| ○ Lesion In AHCs | ○ Lesion in Degeneration of cranial nerve nuclei |
| ↳ Progressive muscular atrophy / primary muscular amyotrophy | ↳ True bulbar palsy |
| ▪ Degeneration of AHCs with signs of LMNL (paralysis, hypotonia , hyporeflexia, wasting)<br>▪ Commonest site in lower cervical & lumbar region hence it stats early in UL distally ( hands → forearm → shoulder) and late in LL<br>▪ Nerve Affect S1 so no Babinski sign | ▪ Clinically tetrad of : dysphagia , dysarthria, dysphonia (hoarseness of voice), nasal regurgitation with :<br>○ Absent reflexes: palatal, pharyngeal<br>○ Tongue is wasted showing fasciculations<br>○ No quadriplegia, no emotional changes |
| C. Spinal- bulbar MND: spinal MND & bulbar palsy | |

3. **Mixed type: Combined UMN & LMN affection:**

**A. Amyotrophic lateral sclerosis (ALS):**

- ○ Amyotrophic = atrophic = LMNL
- ○ Lateral sclerosis = Δ tract = UMNL

- Combined signs & symptoms of upper & lower motor neuron lesion:

| ↳ UMNL : | ↳ LMNL: |
|---|---|
| ○ Pyramidal tract lesion | ○ AHCs lesion |
| ○ + ve Babinski sign<br>○ Weakness of Δ tract distribution | ○ Wasting<br>○ fasciculations |
| → Tone & deep reflexes according to which one is predominant Δ tract or AHC lesion | |

- N.B.: **Tonic atrophy :** hypertonia & hyper-reflexia + wasting & weakness in mixed type of MND in which Δ tract lesion is predominant

B. Mixed bulbar palsy ( mixed bulbar palsy & similar picture of combined affection)

**في حالات ال MND لا تنسى فحص ال Bulbar CN**

❖ **Differential Diagnosis of MND:**

- Other causes which cause Δ tract , AHC lesion e.g. cervical spondylosis , syringomyelia
    - لاحظ ان في حالات ال cervical spondylosis , syringomyelia ← العيان عنده sensory manifestation
    - ولكن في حالة ال MND ← NO sensory changes at all

❖ **أثناء فحص العيان في العملي هتلاقي كل شيئ متفق مع كونه MND ولكن هتلاقي 3 اعتراضات على تشخيصك :**

1. المرض systemic disease, bilateral symmetrical ولكن في الحالة هتلاقي one side affected more than other
2. المرض بيجي في old age وحالتك هتلاقيها young age
3. المرض fatal & survival rate is about 2 years so it's more dangerous than malignancy وحالتك هتلاقيها أكتر من سنتين

❖ **هذه الاعتراضات يمكن تفسيرها كالآتي :**

1. **One side affected more than other :**

- Patient is e.g. right handed, manual worker (MND is a disease of exhausted muscle)

2. **Patient is young age:**

- ALS type can affect young age

3. Survival rate > 2years:

- **Prognosis depends on :**

| | Good prognosis | Bad prognosis |
|---|---|---|
| Fasciculations | ↓↓ | ↑↑ |
| Bulbar affection | - | + |

# MND (Motor Neuron Disease)

- **Personal history :....**
- **Complaint:** Heaviness of both upper and lower of 25 years duration.
- **HPI:**

- The condition started 25 years ago by gradual onset of **weakness** associated with **stiffness**, **marked distal asymmetrical wasting** in both UL and LL and **twitches**. Both weakness and wasting started in both ULs but they are noticeably more on the Rt. Side. Then, they progressed ,one year later, to affect both LLs being more on Lt. side. Weakness was **distal** more than proximal, in **abductor** more than adductor muscles, in **extensor** more than flexor muscles in U.L, while in L.L, it is more in **flexors** than extensor muscles with no involuntary movements.
- No symptoms of **sensory** affection.
- No symptoms of **Bulbar or Cranial Nerve** affection.
- No symptoms of **sphincteric** affection.
- No symptoms of increased **I.C.T.**
- No symptoms of **speech** disorders.
- No symptoms suggesting **other system** affection.

- **Past history:**

- No past history of DM, HTN, fever, Bilharziasis , drugs or operations.

- **Family history:**

- No family history of similar conditions.
- No consanguinity.
- No common disease in family.

- **General examination**
  - **Temperature:** 37.2° c.
  - **Bl. Pressure:** 120/70.
  - **Pulse:** regular, 70 beat/minute, average volume, no special character, vessel wall not felt, equal in both sides with intact peripheral pulsation.
  - **Mentality:** The patient is fully conscious, well oriented for time, place and person. Average mood and memory. The patient is co-operative with average intelligence.
- **Local examination:**
- **Examination of Speech:** Normal.
- **Examination of Cranial Nerves:**

- **Bulbar Cr. Nerves** → free.
- **Other Cranial Nerves** → free.

- **Examination of motor system :**

**Inspection**

- Bilateral asymmetrical distal wasting in ULs and LLs. It's more in right UL and left LL.
- Bilateral Pes cavus, no trophic changes, no involuntary movement, no specific posture.

**Examination of tone**

- Bilateral asymmetrical Hypertonia in upper limbs and lower limbs. It's more in right UL and left LL.

**Percussion**

- Few fasciculation scattered in right UL and left LL with No myotonia.

↳ **Examination of muscle power**

- Bilateral asymmetrical Weakness in upper limbs and lower limbs. It's more in right UL and left LL. It is distal more than proximal, in abductor more than adductor muscles, in extensor more than flexor muscles in UL while in LL, It's more in flexors than extensor muscles.

↳ **Coordination**

- Coordination cannot be examined on both upper and lower limbs because of weakness.

❖ **Reflexes**

  - **Deep reflexes**: Bilateral asymmetrical hyper-reflexia in upper limbs and lower limbs. It's more in right UL and left LL with +Ve pathological reflexes
  - **Superficial reflexes**: +Ve Babiniski on both sides. Abdominal Reflex → Lost.

❖ **Sensory:** All sensations (Superficial, deep, cortical) are intact.
❖ **Back** Normal (No deformities, no pigmentation, no swelling ,no scars).

❖ **Gait** : patient can't walk

❖ **No affection in other system examination :**

❖ **Diagnosis : A case of motor neuron disease, most probably Amyotrophic Lateral Sclerosis .**

### 1. Why MND?

- Purely motor with no sensory or sphincteric manifestations
- Unknown etiology.
- It affects motor neuron only inside CNS.

### 2. Why spinal type?

- Bulbar and spino-bulbar types are excluded because bulbar cranial nerves are free.

### 3. Why ALS?

- Because the patient has wasting and fasciculation which are features of LMNL and at the same time, It has weakness of pyramidal tract distribution with +ve planter reflex which are features of UMNL.

↳ On the light of these confusing data, the case is either:

1- ALS.
2- Cervical spondylosis.
3- Cervical syringomyelia.
→ But because the patient's sensations are intact, It's most probably ALS.

### 4. Criticism to the diagnosis :

- **Asymmetrical →** may be attributed to the patient's life style as he is manual worker using his right UL and left LL and MND is a disease of exhausted muscles.
- **Long survival while MND is of short duration →** prognostic criteria are:
  - Bulbar affection.
  - Fasciculation.

→ Our patient has few fasciculation with no bulbar affection which account for good prognosis and prolonged survival.

- **Early onset of the disease while MND is a disease of old age →** ALS can affect young age.

# Parkinsonism

❖ **Commonest causes of Parkinsonism :**

| | A. Paralysis agitans | B. Atherosclerosis | C. Post encephalitic |
|---|---|---|---|
| ▪ Age | 40-60 years | Over 60 | Any |
| ▪ Onset | Gradual | Gradual | Acute |
| ▪ Course | Progressive | Remission & exacerbation | Regressive or stationary |
| ▪ Tremors & rigidity | T > R | R > T | T = R |
| ▪ Associations | ▪ None | ▪ Amnesia<br>▪ DM, HTN<br>▪ Ischemic heart disease<br>▪ Ischemia of ΔT ; pyramidal signs | ▪ Obesity<br>▪ Diabetes insipidus<br>▪ Pyramidal signs<br>▪ Sialorrhea<br>▪ Greasy face<br>▪ Oculogyric crisis |

❖ **Complaint :** Shaking movements.

❖ **History : Involuntary movements :** أهم حاجة وصف ال

**→ Character:**

1. Static.
2. Regular.
3. ↑ by emotional stress, anxiety & fatigue قوله قوم امشي هتزيد
4. ↓by active voluntary movement, sleep. قوله سلم عليا هتقل
5. **Form:**

**A. U.L:**

- ○ Fingers: flexion & extension of MPJ (Pill rolling).
- ○ Wrist: flexion & extension (+ supination, pronation).
- ○ Elbow: flexion, extension (Severe cases).

**B. L.L:**

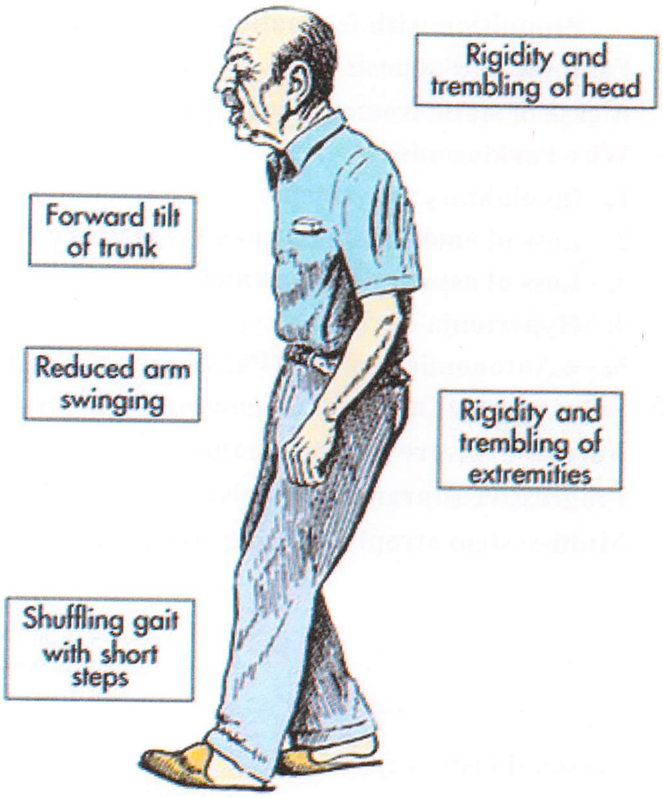
- ○ Toes: flexion & extension.
- ○ Ankle : flexion & extension.

**C. Neck:**

- ○ Flexion & extension (Head Nodding).
- ○ Rotatory movements (rare).

**D. Head:**

- ○ Mandible: rhythmic opening & closure (rare).
- ○ Lip tremors.
- ○ Tongue طلع لسانك وابعده عن سنانك


Rigidity and trembling of head
Forward tilt of trunk
Reduced arm swinging
Rigidity and trembling of extremities
Shuffling gait with short steps

**→ Distribution:**

1. U.L > L.L
2. Unilateral then bilateral (Asymmetrical).
3. Distal.
4. Present in Head & Neck.
5. Trunk (very rare).

❖ **EXAMINATION**

1. **General:**

- ○ Bl. Pr. → ↑ in atherosclerosis.
- ○ Facial expression (Mask Face)

2. **Mentality** → Depression.
3. **Speech** → monotonus speech (Slow, expressionless).
4. **Motor :**

**A. Muscle state:**

- ○ Posture: Generalized flexion attitude (Gorilla-like للإنسانية ماتقولش ).
- ○ Involuntary movements: see before

**B. Muscle tone:** Hypertonia
- ○ **Lead pipe: uniform resistance**
- ○ **cog wheel: resistance is intermittent & interrupted by tremors**

○ **N.B. Rigidity causes → Slow Shuffling gait & Micrographia.**

**C. Muscle power:**
- ○ **Normal power→ No weakness**

○ **طيب لو اتسألت ليه اسمه shaking palsy وليه فيه نوع اسمه paralysis agitans قول أسماء خاطئة حيث أن ال rigidity العنيفة هي اللي بتدي إيحاء أن المريض يعاني من paralysis**

**D. Reflexes:**
- ○ **Hyporeflexia or areflexia**
- ○ **Hyper-reflexia نادراً: If the case is atherosclerotic, pyramidal tract may be also ischemic → UMNL→ Hyper-reflexia.**

**5. Sensory System:** **Normal sensation.**

**6. Gait:**
- ○ **Slow, short steppage → shuffling.**
- ○ **Loss of swinging of arms.**
- ○ **Propulsion with festinating gait (sometimes).**

❖ **Example of diagnosis :**
- **A case of static tremors for D.D most probably Parkinsonism**

❖ **Why Parkinsonism?**
1. **Involuntary movements→ character & Distribution وتقولهم**
2. **Loss of emotional movements (Mask face).**
3. **Loss of associative movements.**
4. **Hypertonia of rigidity type (Lead pipe or cog wheel).**
5. **± Autonomic changes (Parkinsonism Plus): sialorrhea, greasy face, ....**

❖ **What is the differential diagnosis of extra-pyramidal conditions?**
- **Normal pressure hydrocephalus**
- **Progressive supranuclear palsy (PSP) (or the Steele-Richardson-Olszewski syndrome)**
- **Multi-system atrophy causing striatonigral degeneration**

## Parkinsonism

❖ **Personal history :....**

❖ **Complaint:** Shaking movement of both upper & lower limbs since 1967.

❖ **HPI:**
- ○ The condition started since 1967 with regular **shaking movement** at rest increase with **emotion** & decrease with **sleep** affect both upper & lower limbs being much more on right side **distal** more than proximal. No similar shaking movement neither in head, neck nor trunk. Associated with **stiffness** in upper & lower limbs being much more in right side leading to **difficulty** in starting movement & **shuffling** gait.
- ○ Not associated with neither **fever, trauma, vomiting, coma** nor **convulsions.**
- ○ No symptoms of **cranial nerve** affection.
- ○ No symptoms of **speech** affection.
- ○ No symptoms of **sphincteric** affection.
- ○ No symptoms of **increased I.C.T.**
- ○ No symptoms suggesting **other system** affection.

❖ **Past history:**
- ○ No past history of DM, HTN, drugs or operations.

❖ **Family history:**
- ○ No family history of similar conditions.
- ○ No consanguinity, No common disease in family.

## General examination

- **Temp.:** 37.2° c.
- **Bl. pressure:** 220/100.
- **Pulse:** regular, 70 beat/min, average volume, no special ch.ch, vessel wall not felt, equal in both sides with intact peripheral pulsations.
- **Mentality:** the patient is fully conscious well oriented for timeplace & person, average mood (may be euphoric) & memory. The patient is co-operative with average intelligence.
- **Head & Neck:** No mask face.

## Local examination:

**Examination of Speech:** Normal.

**Examination of Cranial Nerves:** **Myerson's sign**

**Examination of motor system :**

### Inspection

- Generalized muscle **wasting** (sunken eye, triceps skin fold, temporalis)
- **Involuntary movements:**

→ **U.L:**

- **Right:** asymmetrical flexion & extension of fingers of Rt. hand (pill rolling) movement,
- **Left:** Normal.

→ L.L:

- **Right:** flexion & extension of toes & ankle,
- **Left:** side to side movement at the ankle.

- **Tongue tremors,** No Nodding, No lip tremors

### Examination of tone

- **Right upper & lower limbs:** marked rigidity of cog wheel ch.ch affecting both flexor & extensor but more in flexors.
- **Left upper & lower limbs:** very mild rigidity in U.L.

### Percussion

- No fasciculation nor Myotonia.

### Examination of muscle power

- **U.L:** Bilateral asymmetrical weakness of pyramidal tract distribution affecting right > left.
- **L.L:** Bilateral asymmetrical weakness affecting distal > proximal more in right.

### Coordination

- Coordination cannot be examined on both upper and lower limbs because of weakness.

## Reflexes

- **Left U.L & L.L:** Normoreflexia.
- **Right U.L& L.L:** Exaggerated response especially biceps, triceps, brachioradialis, knee,
- Lost **planter reflexes** on right side & diminished planter on left.
- **Pathological reflexes:** Positive (patellar & adductor).

**Sensory:** All sensations (Superficial, deep, cortical) are intact.

**Back** Normal (No deformities, no pigmentation, no swelling ,no scars).

**Gait** : Slow, shuffling, short steppage, loss of swinging of arms.

**No affection in other system examination :**

**Diagnosis :** **A case of static tremors for D.D most probably Parkinsonism**

## Disseminated sclerosis
## Multiple sclerosis

❖ **Definition :**

- **Disseminated de-myelinating disease of unknown cause ( may be autoimmune, viral infection)**

❖ **Pathology :** **Demyelination, sclerosis.**

❖ **Course :** **Remission, exacerbation.**

❖ **Precipitating factors:**

| | | |
|---|---|---|
| ○ Fever, infection. | ○ Physical fatigue. | ○ Emotional stress. |
| ○ Operations. | ○ Pregnancy. | |

❖ **Signs & symptoms :**

1. **Mentality changes.**
   - **Euphoria or Depression or Emotional lability (uncontrolled burst of crying or laughing)**
2. **Speech disturbances; Dysarthria:**
   - **Slurred or Staccato or Scanning.**
3. **Cranial nerve involvement specially:**

A. **The optic nerve resulting in:**
- **Diminution or loss of vision due to optic neuritis or primary optic atrophy.**
- **Temporal pallor of optic disc on fundus examination.**
- **Visual field defects and disturbances of colour vision**

B. **The ocular nerves (3,4,6) resulting in:**
- **Diplopia which is a common early symptom.**
- **Ophthalmoplegia**
- **Ophthalmoplegia-internuclearis (pathognomonic)**
- **Due to lesion of the medial longitudinal bundle (MLB) which carries the fibres of the conjugate eye movements.**

→ **On looking to one side there is:**
- ↳ **Nystagmus in the abducting eye.**
- ↳ **Weakness or paralysis of the adducting eye.**

C. **Trigeminal neuralgia : early symptom**

D. **The facial nerve resulting in:**
- **Facial palsy of U.M.N.L. (common) or L.M.N.L. (very rare).**
- **Hemifacial spasm (pathognomonic )**

E. **The cochleo-vestibular nerve : vertigo**

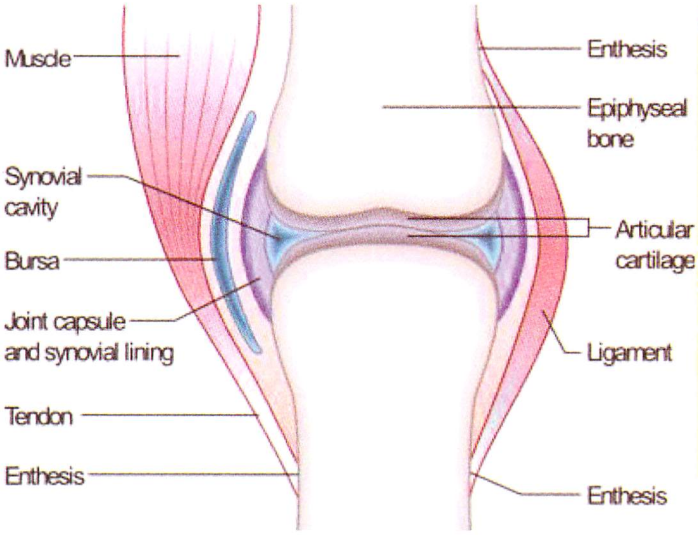
F. **Glossopharyngeal & vagus : bulbar palsy : rare**

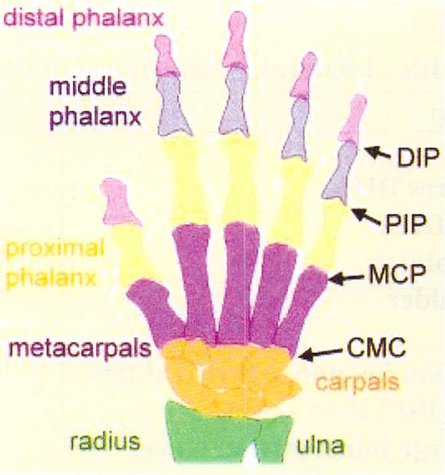
4. **Motor System affection:**
   - **Form : monoparesis, hemiparesis, paraparesis, quadriparesis or pseudo-bulbar palsy.**
   - **This is associated with signs of U.M.N.L. i.e. hypertonia, hyperreflexia, +ve Babinski sign and early loss of the abdominal reflexes.**
5. **Sensory System affection:**
   - **Transient numbness and paraesthesias followed by superficial and/or deep sensory loss but no peripheral neuropathy is present**
   - **+ve L'hermite's sign may be present: on flexion of the head there is sudden electric like sensation radiating to the back and limbs, it is due to posterior column involvement in the cervical region.**
6. **Cerebellar affection:**
   - **Cerebellar ataxia is a common presentation; it is associated with nystagmus, staccato speech, intention kinetic tremors and gait disturbances.**
7. **Autonomic disturbances:**
   - **Precipitancy, hesitancy of autonomic bladder.**
   - **Impotence.**

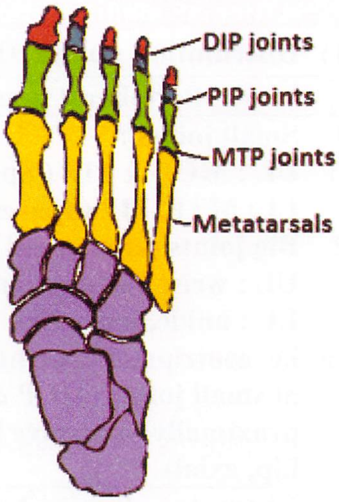
❖ **N.B.: early findings in DS**

- **Optic neuritis, Lost abdominal reflexes & Sphincteric disturbances and impotence**

# RHEUMATOLOGY


Muscle
Synovial cavity
Bursa
Joint capsule and synovial lining
Tendon
Enthesis
Enthesis
Epiphyseal bone
Articular cartilage
Ligament
Enthesis


distal phalanx
middle phalanx
DIP
PIP
MCP
proximal phalanx
metacarpals
CMC
carpals
radius
ulna


DIP joints
PIP joints
MTP joints
Metatarsals

## ❖ Types of joints :

| 1. Peripheral joint | 2. Axial joints | 3. Specific joints |
|---|---|---|
| ● Big :<br>○ UL: wrist, elbow, shoulder<br>○ LL: ankle, knee, hip<br>● Small : the rest | ● Cervical , thoracic, lumbar | ○ Temporomandibular joint (TMJ)<br>○ Sacroiliac joint (SIJ) |

## ❖ Classification of joints :

| ❖ According to number of joints: | ❖ According to onset & duration: | ❖ According to etiology: |
|---|---|---|
| ● Monoarthritis : 1 joint<br>● Oligoarthritis : 2-4 joints<br>● Polyarthritis : > 4 joints | ● Acute : lasting less than 6 weeks<br>● Chronic : lasting more than 6 weeks | ● Degenerative (Mechanical) :<br>○ Osteoarthritis<br>○ Spondylosis<br>● Inflammatory :<br>○ Rheumatoid arthritis (RA)<br>○ Systemic lupus erythromatosis (SLE)<br>○ Ankylosing spondylitis (AS)<br>○ Idiopathic juvenile arthritis (IJA) |

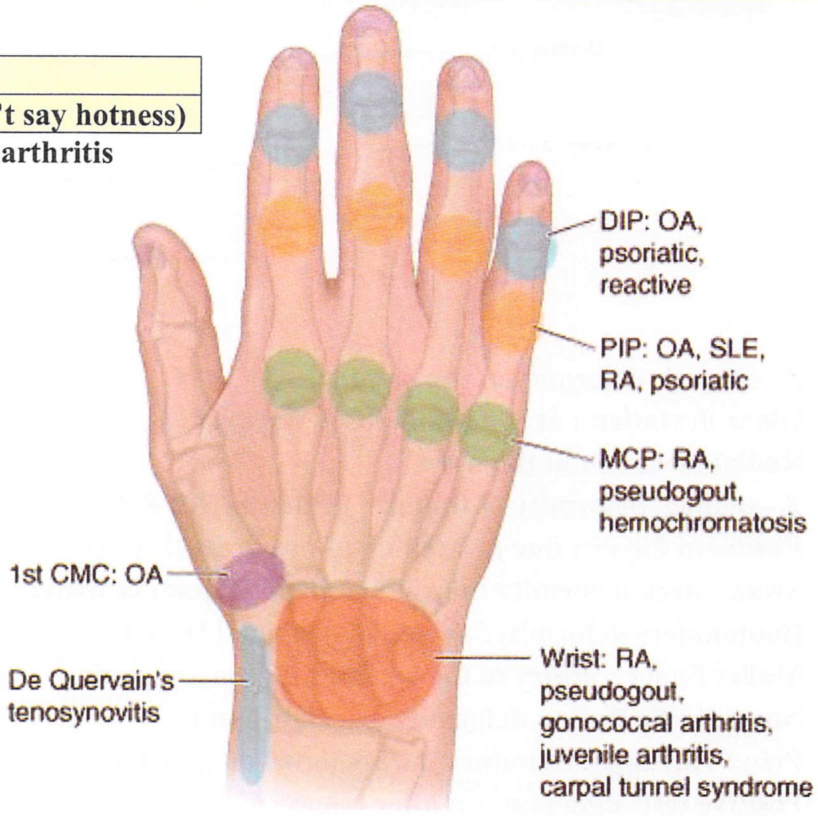
## ❖ Criteria of the activity of the disease clinically:

| | |
|---|---|
| 1. Swelling | 2. Tenderness |
| 3. Erythema (don't say redness) | 4. Warm (don't say hotness) |

- N.B.: redness & hotness are reserved for septic arthritis

## ❖ Arthritis of small joints of the hand :

| |
|---|
| ○ DIP: Distal Interphalangeal joint |
| ○ PIP: Proximal Interphalangeal joint |
| ○ MCP: Metacarpophalangeal joint |
| ○ 1st CMC: 1st carpometacarpal joint |


DIP: OA, psoriatic, reactive
PIP: OA, SLE, RA, psoriatic
MCP: RA, pseudogout, hemochromatosis
1st CMC: OA
De Quervain's tenosynovitis
Wrist: RA, pseudogout, gonococcal arthritis, juvenile arthritis, carpal tunnel syndrome

## ❖ Rheumatoid arthritis = RA :

**❖ Type of patient :**

- Sex : female > male; 3 :1
- Age between 30 -40 years

**Articular manifestations :**

1) **Distribution :** polyarthritis , bilateral, symmetrical affecting :

| A. Peripheral joints: | B. Axial joints : | C. Special joints: |
|---|---|---|
| 1. Small joints :<br>○ UL : MCP & PIP ( Spares DIP)<br>○ LL: MTP, PIP (Spares DIP)<br>2. Big joints (after small joints):<br>○ UL : wrist , elbow, shoulder<br>○ LL : ankle, knee, hip<br>→ i.e. centripetal distribution i.e. polyarthritis starts at small joints (MCP & PIP) then spreads proximally to involve large joints (wrist, Knee, hip, axial) | ○ Cervical joints e.g. atlanto-axial joints | ○ Temporomandibular joint<br>○ Crico-artenoid joint<br>○ Sternoclavicular joint |

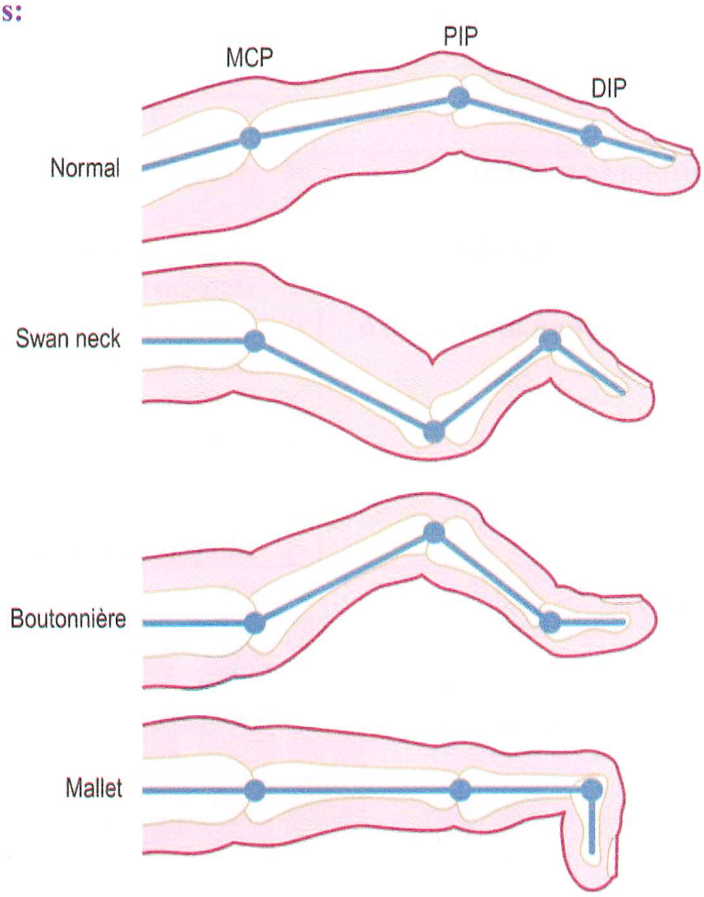
2) **Character :** Severe Arthritis of joints with morning stiffness more than 1 hours (sparing distal IP usually)

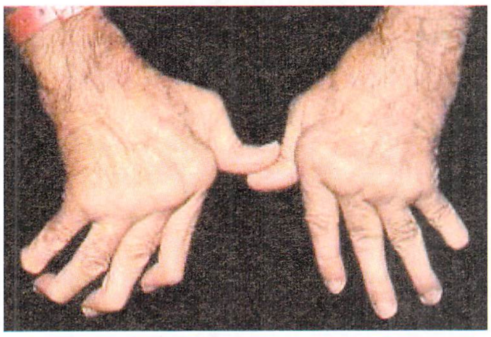
3) **Inflammatory cardinal signs :** erythema , warmth , swelling & tenderness

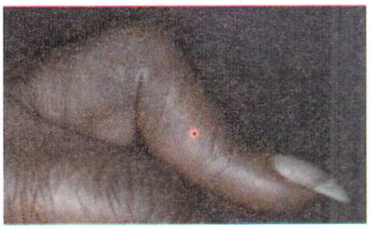
4) **Deformity :** erosive arthritis

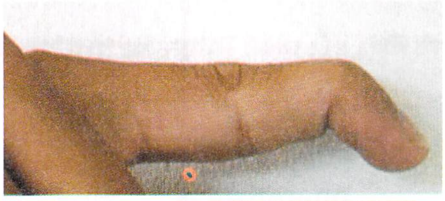
**A. SMALL joints :**

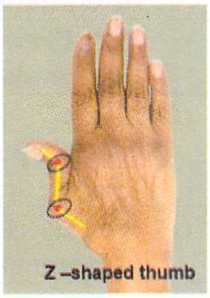
**✌ In Upper limbs:**







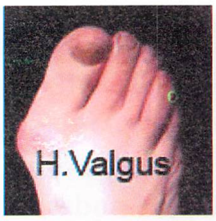


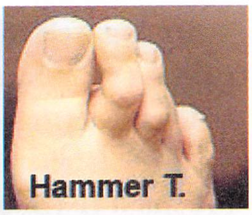


1. Z –shaped deformity of the hand:
   - Ulnar deviation : at MP joint (NOT WRIST)
   - Radial deviation at the wrist
2. Z –shaped deformity of thumb : flexion at MP & hyperextension of proximal IP
3. Fusiform finger : due to swelling of proximal IP joints
4. Swan - neck deformity : flexion of distal IP joint & hyperextension of proximal IP
5. Boutonniere deformity: flexion of proximal IP & hyperextension of distal IP .
6. Mallet finger : injury to the extensor digitorum tendon → end of a finger is flexed towards the palm
7. Non-specific flexion deformity e.g. claw hand
8. Piano-Key Sign: examiner pushes down on distal ulna like a piano key
   - Positive test: ulna pops up after release of the downward pressure

**In lower limbs:**

- Big toe : hallux valgus
- Small toes : hammer toes (flexion deformity)





B. **BIG JOINTS :** mainly flexion deformities , genu valgum and genu varum

**Extra-articular manifestations:**

1. **Systemic:** usually mild, see later with systemic examination of the case
2. **SC nodules :**

A. **Pathology:**

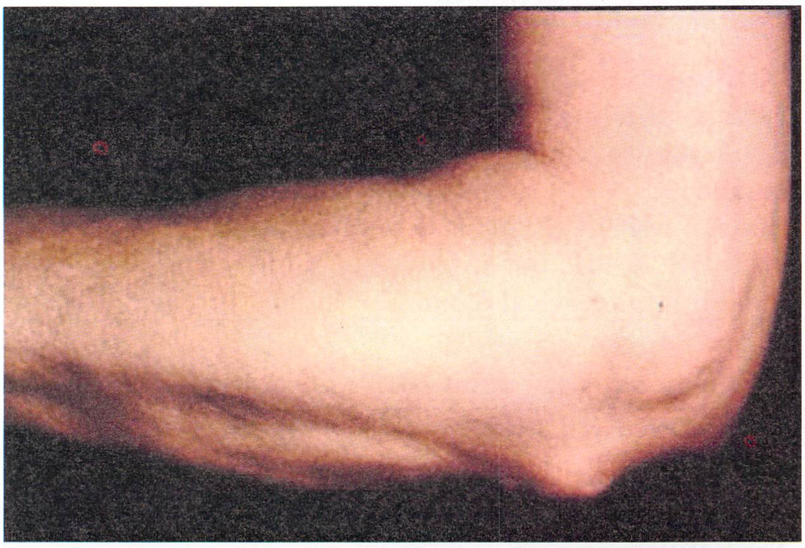
- Central fibrinoid degeneration (necrosis) with inflammatory cells covered by fibrous capsule.

B. **Site:**

- Pressure points e.g. elbow & knee
- Extensors surface of the limbs
- In relation to tendons (tendo-Achiles, extensor tendon of hands)

C. **Character:**

- Oval, variable size firm, painless, mobile.



D. **Significance :**

- Strongly positive rheumatoid factor
- Prognostic : bad prognosis

E. **Differential diagnosis :**

- SC nodules of rheumatic fever
- Heberden's & Bouchard nodes of OA
- Tophi of gout

F. **Course:**

- Transient, disappear

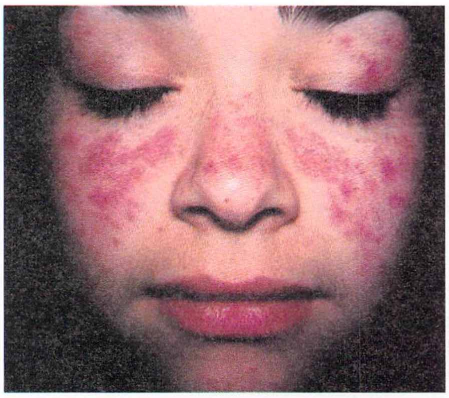
G. **Complications**

- Ulceration & infection
- Rupture tendon : finger drop, foot drop
- Trigger finger

## ❖ Systemic Lupus Erythematosus (SLE)

❖ **Type of Patient :**

✓ Sex: females more than males; 10 : 1
✓ Age : 2nd & 3rd decade



**Articular manifestations :**

○ **Distribution :** like RA
○ **Character :** mild
- Mild arthralgia (rarely arthritis ), myalgia
- NO deformities

**Extra-articular manifestations:**

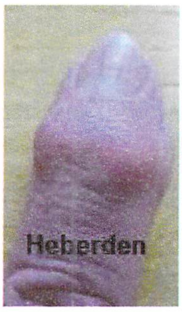
○ Usually severe (kidney)
○ **NO** subcutaneous nodules

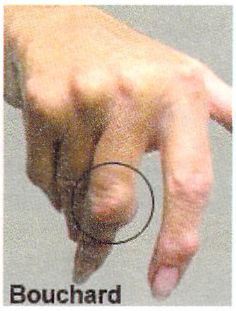
| ❖ Rheumatic fever: | ❖ Gout |
|---|---|
| • Polyarticular, fleeting, affecting big joints<br>• Associated with other major or minor criteria of Rheumatic fever | • Starts at MP of big toe<br>• May affect distal IP of hand & feet<br>• Acute inflammation + raised serum uric acid<br>• Gouty tophi :<br>○ Hard, tender, if squeezed → chalky material (urate crystals)<br>○ Site : dorsum of hand, ear pinna |

- **What are 3 principal crystals associated with joint inflammation?**

| | | |
|---|---|---|
| ○ Urate : gout | ○ Calcium pyrophosphate : pseudogout | ○ Hydroxyapatite : pseudo-pseudogout |

## ❖ Osteoarthrosis = Osteoarthritis = OA





- Affecting weight bearing joint in limb or vertebrae
- Pain is only related to movement + coarse crepitus at joint occur
- Osteophytes (hard nodes) in :

- Distal IP (Heberden nodes) &
- Proximal IP (Bouchard nodes) in juvenile type

**❖ Type of Patient :**

✓ **Sex:** females more than males

✓ **Age :** mainly elderly

**❖ Types of osteoarthritis :**

- **Primary:** e.g. hand : nodal generalized osteoarthritis with Osteophytes (hard nodes) in distal IP (Heberden nodes) & proximal IP (Bouchard nodes) in juvenile type
- **Secondary :** trauma , inflammation, acromegaly , etc…

**➯ Extra-articular manifestations: none**

**➯ Articular manifestations :**

A. **Distribution :** localized or generalized :

▪ Peripheral joints :

  ○ Big: e.g. knee & hip

  ○ Small :

   - Hands : DIP& PIP, but spares MCP joints
   - Feet: DIP & PIP, but spares MTP joints

▪ Axial joints : cervical & lumbar

B. **Character :**

  ○ Crepitus

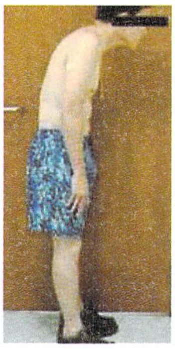
  ○ Osteophytes (Nodules)

  ○ Minimal deformities

- **Which arthritis can affect DIP?**

| | | | |
|---|---|---|---|
| ○ Osteoarthritis | ○ Psoriasis | ○ Juvenile arthritis | ○ Gout |

## ❖ Ankylosing spondylitis



**❖ Type of Patient :**

✓ **Sex:** males more than females; 3 : 1

✓ **Age :** 2nd & 3rd decade (nerve over 45)

**➯ Articular manifestations :**

A. **Distribution :** polyarthritis

▪ Axial joint : cervical, thoracic & lumbar

▪ Special joint : sacroiliac joint

▪ Peripheral joint : Asymmetrical specially in LL

→ **Centrifugal distribution** i.e. polyarthritis starts at large joints (axial, hip, Knee, ankle, shoulder, elbow , wrist) then spreads distally to involve peripheral small joints (MCP & PIP)

B. **Character :**

  ○ Back pain with limitation of movements (Morning stiffness)

  ○ Deformities e.g. kyphosis

**➯ Extra-articular manifestations:**

  ○ Usually mild

  ○ Specially **I**ris & aortic **I**ncompetence (AR)

**❖ How to differentiate between articular & non-articular arthritis?**

| Articular | Non-articular |
|---|---|
| ○ Tender joint. | ○ Tenderness outside joint lines. |
| ○ Disturbed active &passive movement. | ○ Passive movement is better than active. |
| ○ Deformity | ○ No deformity.<br>(As bursitis & tendonitis) |

**❖ How to differentiate between inflammatory & mechanical arthritis?**

| Inflammatory | Mechanical |
|---|---|
| ○ Increased by rest. | ○ Increased by activity. |
| ○ Decreased by activity. | ○ Decreased by rest. |
| ○ More in morning. | ○ More at night. |

# RHEUMATOLOGY HISTORY

❖ **Personal History:**

| | | |
|---|---|---|
| 1. **Name:** الإسم ثلاثي | 2. **Age:**<br>○ Child : still's disease & rheumatic fever<br>○ Middle age : gout, rheumatoid, SLE<br>○ Old age : osteoarthrosis | 3. **Sex :**<br>○ Female : rheumatoid, SLE<br>○ Male : ankylosing spondylitis & Reiter's syndrome |
| 4. **Occupation:**<br>○ May predispose to osteoarthrosis | 5. **Marriage**<br>6. **Menstrual history if female.** | 7. **Residence & address** |
| 8. **Habits of medical importance** | | 9. **Handedness.** |

❖ **Complaint + duration:** إي اللي جابك المستشفى ؟ : Pain in both hands

❖ **History of present illness = HPI** المرض بدأ معاك إزاي , آخر مرة كنت كويس فيها إمتى ؟

### 1) Pain؟ هل مفاصلك فيها ألم ؟

1. **Onset:** الموضوع بدأ معاكي بالتدريج ولا مرة واحدة ؟
    - Gradual : rheumatoid arthritis , SLE
    - Acute : gout & rheumatic fever
2. **Course:** بيزيد ولا بيقل ولا بيروح ويجي ؟
    - Progressive : osteoarthritis
    - Regressive : Rheumatic fever
    - Remittent: rheumatoid & chronic gout
3. **Duration :** لمدة أد اي ؟
- Long: rheumatoid arthritis, SLE
- Short : acute gout & rheumatic fever
4. **Site :** spine lesion may cause radicular pain
5. **Type :** morning stiffness & duration
- In Rheumatoid Arthritis more than 1 hour
○ هل مفاصلك مخشبة (ناشفة أو مكلبشة) عليكي الصبح ولمدة أد اي ؟ وبتطرى او بتفك بعد اد اي ؟
- N.B.: morning stiffness may improve by treatment so history of drug intake is important.
6. **Precipitating factors:** في حاجة بتزود أو تقلل الألم ؟
- Diuretics & diet: precipitate gout
- Throat infection : precipitate rheumatic fever
7. **Aggravating & relieving factors :** بيزيد بالراحة ولا المجهود ؟
○ Inflammatory arthritis (Rh.arthritis) : ↑ by rest & ↓ by activity
○ Mechanical arthritis (osteoarthrosis) : ↓ by rest & ↑ by activity
8. **Diurnal variation** : الصبح أكتر ولا على نهاية اليوم ؟
○ Inflammatory arthritis : ↑ in morning & ↓ by end of day
○ Mechanical arthritis : ↓ in morning & ↑ by end of day
9. **Functional disability** : ability to work
○ لسه بتقدري تعملي شغل البيت ولا لأ ؟

### 2) Swellings

○ هل مفاصلك ورمت ؟ أي مفصل ؟ هل الورم مستمر ولا بيروح ويجي ؟
- **Episodic arthritis (signs of inflammation)** : describe frequency & duration

○ هل حصل اي التهابات في المفصل قبل كده واحمرت ووجعتك ؟
- **SC nodules (extra-articular manifestation)**

○ هل في كلاكيع صغيرة ظهرت لكي قبل كده ؟

### 3) Deformities ؟ هل حصل تشوهات , في اي مفصل ؟

❖ **Pattern of affection :**

○ هل واخده مفصل واحد ولا أكتر من مفصل ؟
- Monoarticular : suppurative arthritis & hemarthrosis, gout (recurrent in big toe)
- Polyarticular : rheumatoid arthritis, SLE
- Oligoarticular : osteoarthrosis
- Fleeting : rheumatic arthritis

### 4) Associated non articular symptoms = Systemic manifestations = Symptoms of other systems :

❖ هل مع التعب ده في أعراض تانية ؟

❖ Multisystem complaints : Rh.A, SLE :
1. Weight loss, low grade fever
2. Ocular manifestations
3. Cardiac symptoms , chest symptoms , GIT symptoms , renal symptoms (nephrotic syndrome)
4. Anemia symptoms
5. Skin : SLE , progressive systemic sclerosis:

- *In SLE : In addition, ask for Mucoctaneous changes "DLE":*
- *Discoid lupus : maculopapular rash in butterfly area.*
- *Photo sensitivity* وشك بيزنهر لما بتقفي في الشمس
- *Others : hyperpigmentation, vitilligo, alopecia, Raynaud's phenomenon, finger ulcers*

6. Abdominal pain & fever: Familial Mediterranean Fever
7. Bleeding PR : enteropathic colitis
8. Bloody diarrhea in SLE
9. Neurologic : Charcot's joint
10. Bleeding tendency : hemarthrosis, Henoch- Shoenlein purpura

### 5) Investigations & treatments:

- Hospitalization, medical treatment, physiotherapy & surgery

### A. Past history as usual but focus on :

- Trauma: hemarthrosis, osteoarthrosis
- Raynaud's phenomenon (Pallor, Cyanois, Rubor) : progressive systemic sclerosis
- Psoriasis : in psoriatic arthritis
- Treatment history : previous treatment & its efficacy

### B. Family history as usual & asked for:

- Osteoarthrosis
- Rheumatoid arthritis
- Gout
- Familial Mediterranean Fever (FMF)

## General Examination Of Rheumatologic Case

❖ Examination as general examination but stress on the following:

I. **Vital signs :** Pulse : vasculitis → absent peripheral pulsations

II. Other systems except that of local exam :

<table>
<tr><th>Rheumatoid arthritis</th><th>Systemic lupus erythematosus</th></tr>
<tr><td colspan="2">❖ Criteria for diagnosis</td></tr>
<tr><td>• At least 4 of the following 7 criteria :<br>1. Morning stiffness more than 1 hour<br>2. Arthritis of 3 or more joints<br>3. Arthritis of hand joints<br>4. Symmetrical arthritis<br>○ All of the above must be present for at least 6 weeks<br>5. SC rheumatoid nodules<br>6. Charactertis X-ray findings<br>7. Positive rheumatoid factor</td><td>• At least 4 or more of the following :<br>1. Malar or butterfly rash<br>2. Discoid rash<br>3. Photosensitivity<br>4. Painless oral ulcer<br>5. Peripheral joints arthritis : 2 or more peripheral joints<br>6. Pleurisy or pericarditis<br>7. Proteinuria<br>8. Psychosis or seizures<br>9. Pancytopenia<br>10. Positive Antinuclear antibody<br>11. Positive anti-double stranded DNA antibody or anti smith antibody</td></tr>
<tr><td colspan="2">❖ General</td></tr>
<tr><td colspan="2">○ Fever, fatigue , weight loss<br>○ Cushingoid features secondary to cortisone therapy</td></tr>
<tr><td>○ Morning stiffness lasting for 1 hour or more (history)</td><td></td></tr>
<tr><td colspan="2">❖ Skin</td></tr>
<tr><td>• Psoriatic arthropathy "seronegative" affect distal IP joints (arthritis mutilans): Psoriasis of skin extend to nail<br>• SC rheumatoid nodules<br>• Palmer erythema<br>• Pallor due to anemia</td><td>• Malar rash : erythema over the cheeks<br>• Butterfly rash : erythema on the cheeks & nose<br>• Discoid rash :<br>○ Erythema , scar formation, scaling , skin pigmentation & telangiectasia occur over the face & neck.<br>• Photosensitivity: Skin rash as a result of unusual reaction to sunlight<br>• Alopecia , vitiligo<br>• Vasculitis :<br>○ Purpura & leg ulcer<br>○ Raynaud's phenomenon</td></tr>
</table>

<table>
<tr><th colspan="2">❖ Eye</th></tr>
<tr><td>1. Conjunctivitis , scleritis with repeated attack can cause scleromalcia (Blue sclera)<br>2. Ankylosing spondylitis : anterior uveitis<br>3. Sjogren's syndrome:<br>○ Arthritis<br>○ Dry eye (xerophthalmia) = keratoconjunctivitis sicca (Schirmer's test)<br>○ Dry mouth (xerostomia), Dry skin, Dry vagina<br>○ Lymphadenopathy : there is increased incidence of lymphoma<br>○ Renal tubular acidosis & Raynaud's phenomenon<br>○ Associated auto immune diseases e.g. myasthenia gravis , autoimmune hepatitis , thyroid diseases<br>4. Reiter's syndrome : sero –ve arthritis :<br>○ Arthritis , Conjunctivitis, Urethritis<br>5. Bechet's syndrome: sero –ve arthritis<br>○ Arthritis, Iritis<br>○ Oral & genital ulceration<br>○ Occlusive vasculitis (IVC thrombosis)</td><td>○ Conjunctivitis , scleritis, anterior uveitis</td></tr>
<tr><th colspan="2">❖ Cardiac</th></tr>
<tr><td colspan="2">○ Pericarditis, myocarditis , effusion, Systemic hypertension , ischemic heart disease</td></tr>
<tr><td>• Rheumatoid arthritis: AR due to vasculitis , not due to endocarditis<br>• Ankylosing spondylitis : AR</td><td>• Libman endocarditis (non infective endocarditis ) = verrucous endocarditis : aortic & mitral regurge</td></tr>
<tr><th colspan="2">❖ Chest</th></tr>
<tr><td colspan="2">• Pleural effusion, pleurisy (rub), interstitial fibrosis, Pulmonary hypertension</td></tr>
<tr><td>• Caplan's syndrome (RA + pneumoconiosis + Rheumatoid nodules in x ray lung)</td><td>• Pulmonary infarction (Shrinking lung syndrome )<br>• Acute respiratory distress syndrome</td></tr>
<tr><th colspan="2">❖ CNS</th></tr>
<tr><td colspan="2">○ Peripheral Neuropathy :peripheral neuritis & carpal tunnel syndrome افحصها (see later in endocrinology)<br>○ Myopathy<br>○ Cerebral vasculitis : stroke , Chorea, Depression, Epilepsy</td></tr>
<tr><td>○ Atlanto-axial sublaxation : spinal cord compression → paraplegia<br>○ Wasting of the small muscles of the hand</td><td>○ Transverse myelitis</td></tr>
<tr><th colspan="2">❖ GIT</th></tr>
<tr><td>1. Felty's syndrome :<br>○ Arthritis<br>○ Splenomegaly with hypersplenism<br>○ Pancytopenia , Lymphadenopathy<br>2. Still's disease :<br>○ Fever , Skin rash, Splenomegaly<br>○ Rheumatoid Factor : usually negative<br>○ Late arthropathy so misdiagnosed as hematological disorder.<br>3. Hepatosplenomegaly : amyloidosis if long standing<br>4. Palpate iliac fossa for Crhon's disease & ulcerative colitis (colitic arthropathy - seronegative)<br>5. Urethra : urethritis in Reiter's syndrome "seronegative"</td><td>• Lymphadenopathy<br>• HepatoSplenomegaly<br>• Painless oral ulcers</td></tr>
<tr><th colspan="2">❖ Renal</th></tr>
<tr><td>• Lower limb edema due to:<br>○ Nephrotic syndrome to amyloidosis or drug induced GN<br>○ Pulmonary hypertension or IPF: cor pulmonale<br>○ Myocarditis : HF</td><td>• lupus nephritis :acute or chronic renal failure</td></tr>
</table>

# Local Examination Of Rheumatologic Case

| | | |
|---|---|---|
| 1) Inspection | 2) Palpation | 3) Movements (Motion) |

## 1) Inspection:

1. **Deformity:**

A. **In UL & LL:** see before Boutonniere, Swan neck, Hallux valgus … etc.

B. **Back :** بص مرة من قدام ومرة من الجنب ومرة من ورا

- ○ From the side, for cervical, thoracic & lumbar curves e.g. thoracic Kyphosis or cervical & lumbar lordosis
- ○ From behind , for scoliosis; an imaginary line drawn from T1 should fall through the gluteal cleft
- ▪ Kyphosis (DD postural & structural ) :
  - Postural kyphosis disappears by axillary suspension of the patient or putting him in prone position i.e. correctable

2. **Distribution:** symmetrical peripheral polyarthropathy centripetal extension in rheumatoid arthritis

3. **Description:**

A. **Skin :**

- ○ Erythema (acute arthritis), swelling
- ○ Palmer erythema
- ○ Scar for operation (synovectomy) or arthroscopy or trauma
- ○ Trophic changes, scaly skin lesions & nail pitting in Psoriasis

B. **Joint contour :** for displacement (Sublaxation)

- ○ The most common displacement is at MCP
- ○ The most dangerous displacement is atlanto-axial joint

C. **Swellings :**

| A. SC nodules : | B. Fluid : Effusion : | C. Bone swelling : |
|---|---|---|
| ▪ **Sites :**<br>A. Pressure points e.g. elbow & knee<br>B. Extensors surface of the limbs<br>C. In relation to tendons (tendo-Achiles, extensor tendon of hands) | ▪ **Sites :**<br>A. IPJ : fusiform finger<br>B. MCP J: obliteration of spaces between knuckles<br>C. Wrist: diffuse swelling<br>D. Knee : swelling around patella | ▪ In osteoarthritis<br>▪ **Sites :**<br>A. Distal IP (Heberden nodes)<br>B. Proximal IP (Bouchard nodes) |

D. Soft tissue swelling: synovium & bursa

1) **Thickened synovium :**

↳ Site: over wrist & upper border of patella

2) **Bursa :** traumatic cases or rheumatoid arthritis or gout

↳ Sites :

A. Prepatellar bursitis, "housemaid's knee"
B. Infrapatellar bursitis, "clergyman's knee"
C. Trochanteric bursitis, giving pain over lateral aspect of hip
D. Olecranon bursitis, "student's elbow", characterized by pain and swelling in the elbow
E. Subacromial bursitis, giving shoulder pain, is the most common form of bursitis.

D. **Surrounding structures:**

- ○ Muscle spasm in paraspinal muscles in ankylosing spondylitis
- ○ Muscle wasting : in UL & LL : refer to neurology "wasting landmarks"

4. **Complication:** ulceration , rupture tendon (finger drop), trigger finger, carpal tunnel syndrome

5. **Gait & posture:** in LL & spine.

❖ N.B.: skin, joint contour, swellings, movement: can be examined as combined inspection & palpation.

## 2) Palpation:

### 1) Skin:

- For temperature : warmth (first at joint line then compare above & below):
  - بتحس بظهر الايد وقارنها بحته فوق وحته تحتها مش بالناحية التانية
    - If temperature ↑ → activity

### 2) Joint contour for displacement (Sublaxation), MCP, PIP, DIP, wrist

- بمشي ايدي على خط المفصل : الطبيعي كلهم على خط واحد , لو ايدي نزلت في حتة تبقى displaced
  - ✓ If there is ulnar deviation → surely there is MCP sublaxation.

### 3) Tenderness : at joint line (articular surface) عينك على وش العيان

| A. UL | B. LL | C. Back |
|---|---|---|
| 1. IPJ: by lateral compression, side to side<br>2. MCP J: metacarpal squeeze test for all or separately by 2 thumb from up & down<br>3. Wrist (Flexed): 2 thumb form above and below compression.<br>4. Elbow : from up & down<br>5. Shoulder : palpate around joint line خط القميص | 1. MTP J: metatarsal squeeze test<br>2. Ankle joints: 2 thumb form above and below compression.<br>3. Knee joints: is elicited with the knee flexed 90° and the patient's foot resting on the table. The examiner's index & middle finger probes the meniscus along the joint line. | ○ Palpate & percuss over the spine for tenderness: either by 2 thumbs in each vertebra or by your fist |

### 4) Swellings:

**A. SC nodules:** special sites: see before.

- **Character:** Oval, variable size , firm, painless, mobile.

**B. Effusion; fluctuant :** in knee joint ( In knee effusion search for Becker's cyst)

- **Character:** Cystic , has no edge with positive test for effusion:

**Transpatellar fluctuation test (huge):**

- خلي ركبة العيان مفرودة على الآخر
- اعصر من فوق الركبة متجها لأسفل علشان تزق السائل كله لجوه المفصل { لانه ممكن يكون راح لل supra-patellar pouch }
- ثم زق بال index واستقبل بال thumb
- لو في massive effusion حتلاقي transmitted impulse من ال index لل thumb والعكس

**Patellar tap (moderate):**

- خلي ركبة العيان مفرودة على الآخر
- اعصر من فوق الركبة متجها لأسفل علشان تزق السائل كله لجوه المفصل
- دوس بال index & middle finger عموديا من فوق
- لو حسيت بعضم ← no effusion
- لو حسيت بحاجة بتنزل وتطلع ← moderate effusion

**Milking or massage or bulge method (mild):**

- خلي ركبة العيان مفرودة على الآخر
- زق من فوق الركبة متجها لأسفل علشان تزق السائل كله لجوه المفصل *وبعدين شيل ايدك (هناك بعض الدكاترة يترك يده)*
- فضي السائل بايديك من ال medial compartment of the knee وبعدين ارجع زق بايدك من ال lateral compartment
- لو في mild effusion حيظهر bulge على ال medial compartment

**C. Bony thickening:**

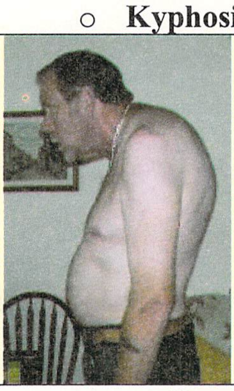
- **Character :** Hard in consistency, fixed, on dorsolateral surface (never on palmer surface)
- **In osteoarthritis :** distal IP (Heberden nodes) & proximal IP (Bouchard nodes)

**D. Thick synovial membrane by rolling technique by your fingers :**

- **Character :**
  - Doughy sensation
  - Firm in consistency ( elastic or buggy or rubbery)
  - Has an edge & non fluctuant swelling
- **Site :** wrist , upper border of patella
- **DD from effusion :**
  - Effusion is cystic in consistency , no edge & has a special tests for effusion

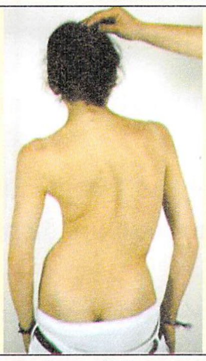
## ❖ Inspection

**○ Kyphosis**

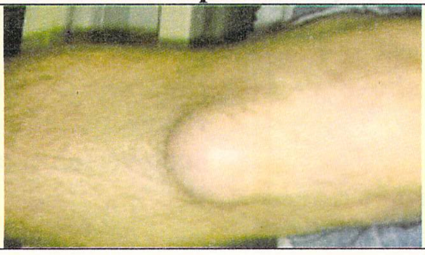


**○ Lordosis**

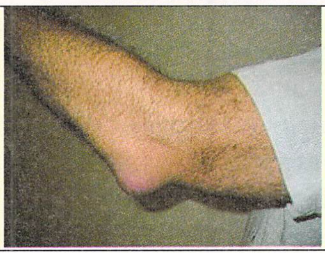
**○ Scoliosis**



**○ Prepatellar bursitis**



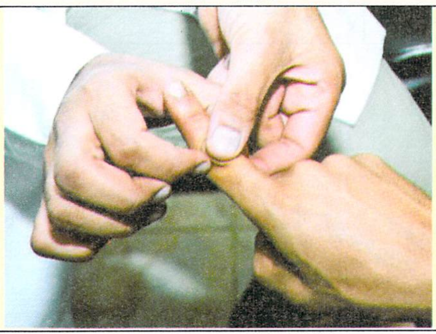
**○ Olecranon bursitis**



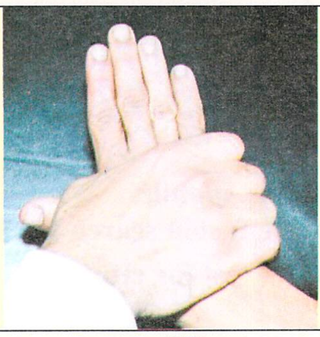
## ❖ Examination : Tenderness

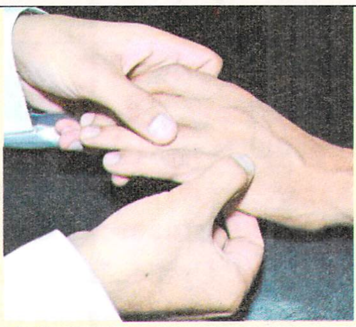
### ↳ UL

**○ IPJ**

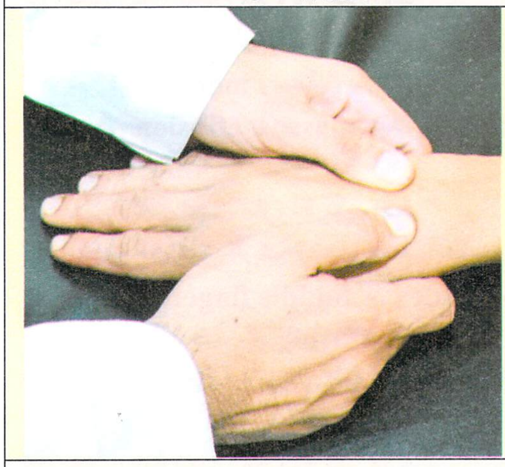


**○ MCP J**

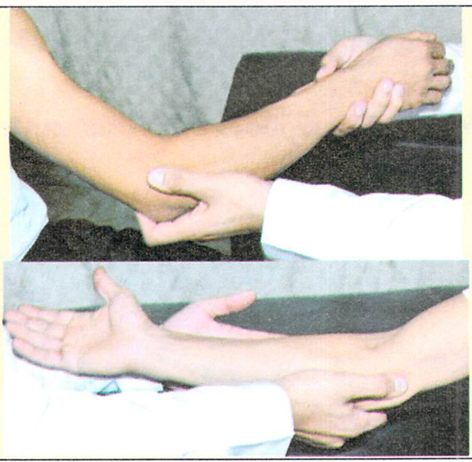




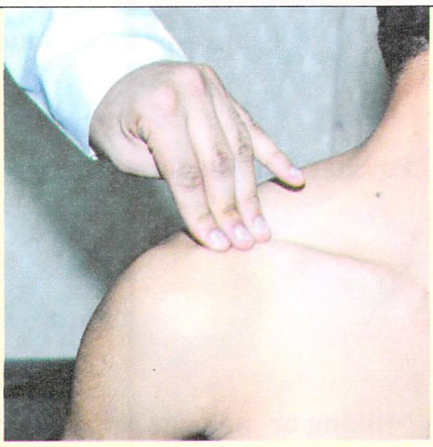
**○ Wrist**



**○ Elbow**

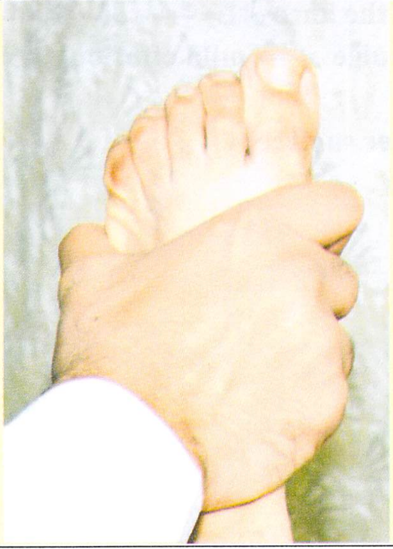


**○ Shoulder**

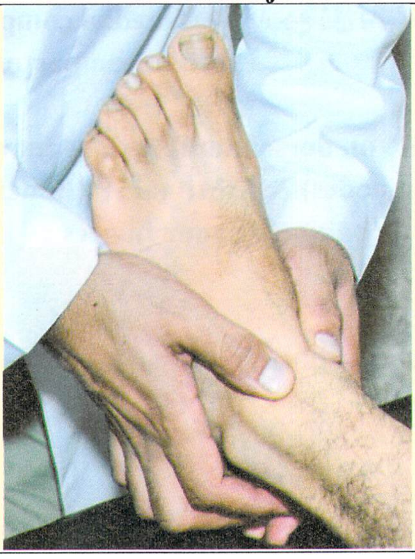


### ↳ LL

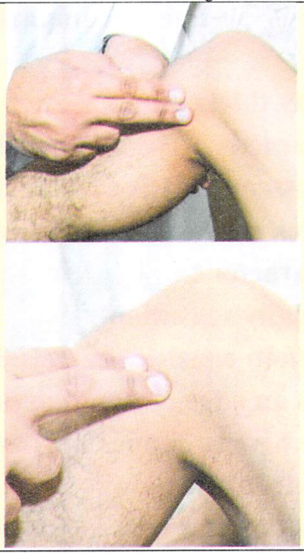
**○ MTP J**

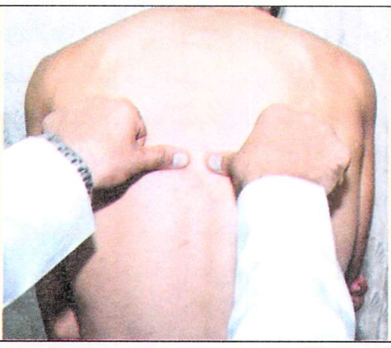


**○ Ankle joint**

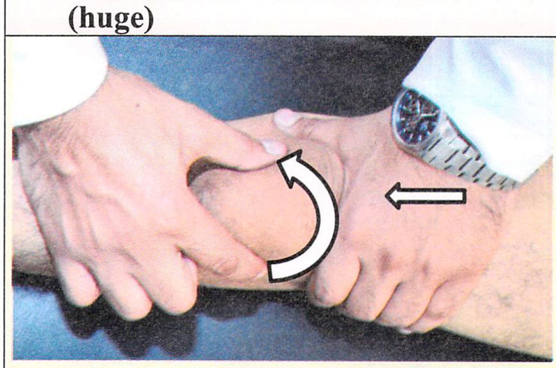
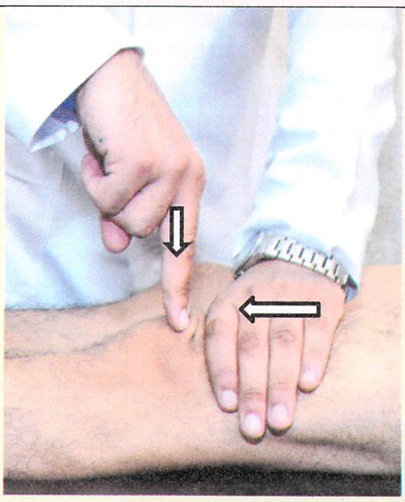
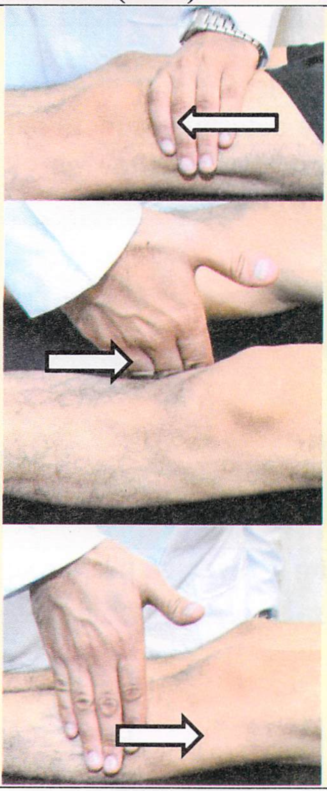


**○ Knee joint**



| ↳ Back | |
|---|---|
|  | |

❖ Examination : Effusion; fluctuant

| ○ Transpatellar fluctuation test (huge) | ○ Patellar tap (moderate) | ○ Milking or massage or bulge method (mild) |
|---|---|---|
|  |  |  |

## 3) Movement:

1. **To detect pain & tenderness**
2. **For crepitus: audible or palpable sound in the joint**

○ **Fine crepitus : not transmitted outside the joint (by stethoscope) → soft tissue pathology (capsule & synovium)**

○ **Coarse crepitation : transmitted outside the joint → bone & cartilage pathology (osteoarthritis)**

→ **N.B.: Crepitus in RA is coarse tender crepitus due to 2ry osteoarthritis**

3. **Range of movement: active & then passive , accurately by goniometer**

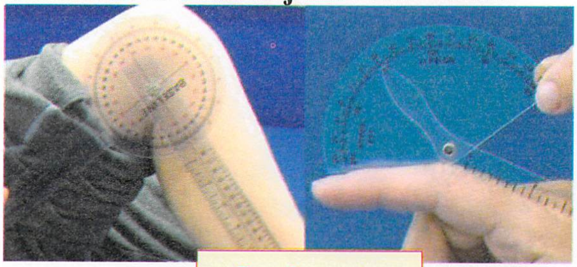
○ **In no movement (100%) limitation : ankylosing spondylitis**

○ **Limited in all direction in Rheumatoid arthritis (limitation of movement in active & passive to the same extent)**

○ **Abnormal in Charcot's joint "neuroarthropathy" : non-infectious destruction of bone & joints associated with neuropathy**

❖ **Why do you examine movement passively after active examination?**

- **Limitation in passive = limitation in active movement → arthritis**
- **Passive move movement is better than active movement in:**
  - **Nerve affection**
  - **Myopathy**
  - **Rupture tendon**



**Goniometer**

❖ **Range of motion:**

1. اطلب من العيان انه يعمل الحركة لوحده وشوف هيعمل الحركة للآخر ولا لأ ← **active**
   - ○ في مفاصل هتطلب من العيان يحركها زي ما أتعلمنا في ال **neurology**
   - ○ وفي مفاصل أخرى هتطلب من العيان يعملها بطريقة معينة هيتم شرحها بعد قليل
2. بعدها الدكتور يعمل للعيان الحركة ← **passive**

> ملاحظة: لما يقولك في الاوسكي افحص **hand** ولاقيتها **RA** لا تندفع ناحية فحص ال **deformity**
> ولكن افحص كل حاجة زي ما تعلمنا في ال **General**

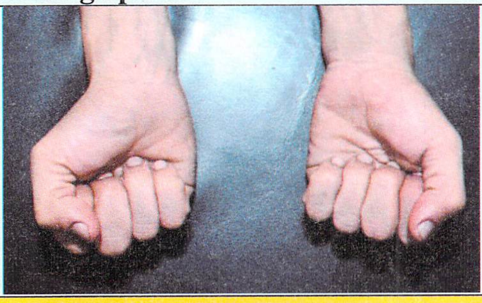
## ❖ Peripheral joints:

### 1. Fingers: see neurology

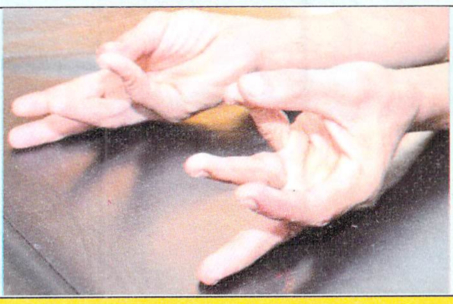
- **Flexion, Extension, Abduction, Adduction, Opposition**

❖ **How to determine functional state (capacity) of joint?**

📖 **Fist test : degree of power of fist = Hand grip "power grip"**

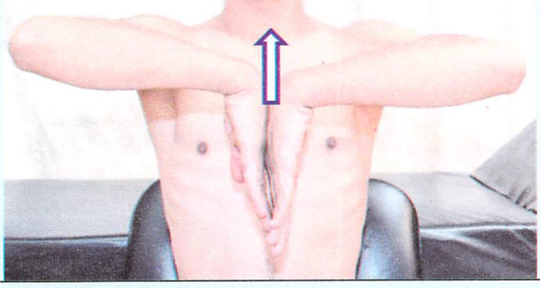


📖 **Pinch test: degree of power of opposition "precision pinch"**

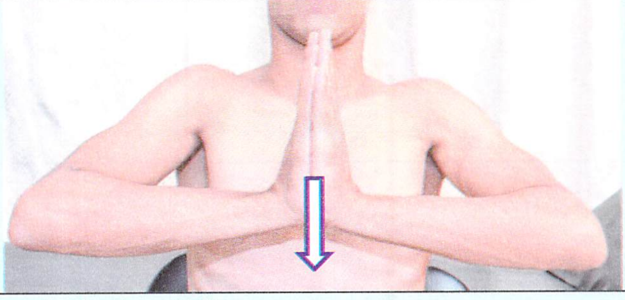


### 2. Wrist:

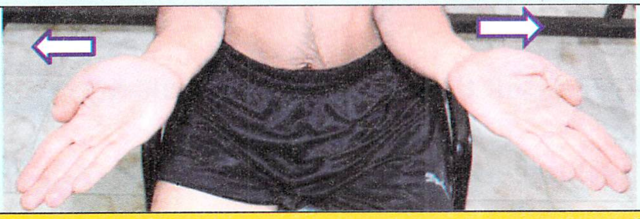
- ○ **Flexion = reversed prayer sign**
  - ○ ظهر ايديك في بعض وارفعهم لفوق



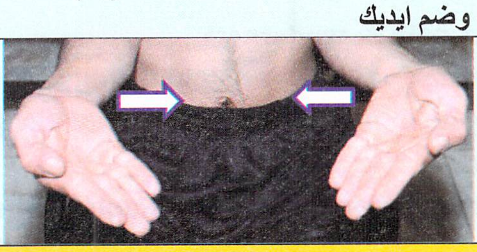
- ○ **Extension = prayer sign**
  - ○ بطن ايديك في بعض ونزلهم لتحت



- ○ **Radial deviation (20)**
  - ○ مد ذراعيك وابعد ايديك



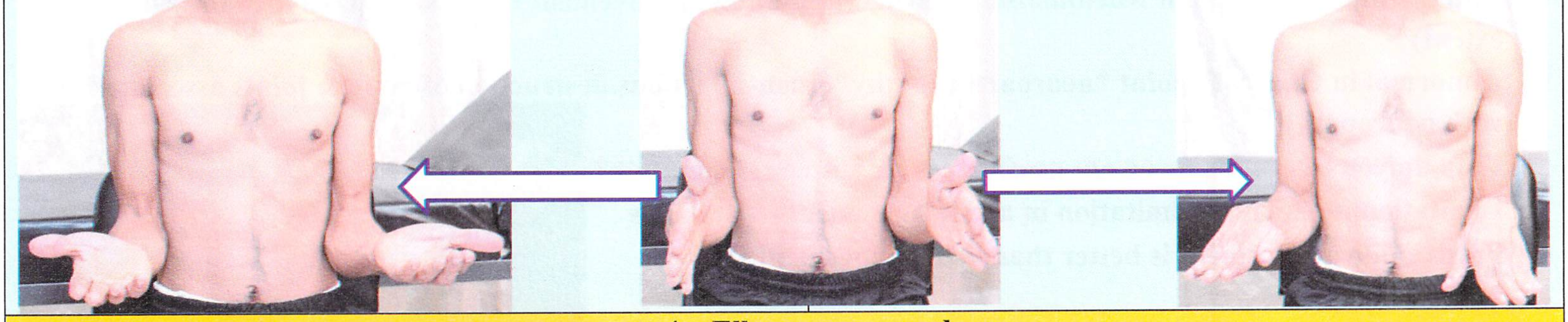
- ○ **Ulnar deviation (30)**
  - ○ مد ذراعيك وضم ايديك



### 3. Radio-ulnar joint

- ○ خلي العيان يحط ايديه جمبه وكوعه زاوية قائمة وال **2 thumbs** باصين لفوق

- ○ **Supination (0-90°)** كف ايديك للسقف
- ○ **Pronation (0-90°)** كف ايديك للأرض

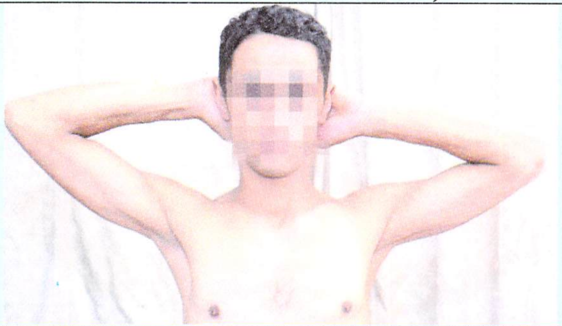


### 4. Elbow: see neurology

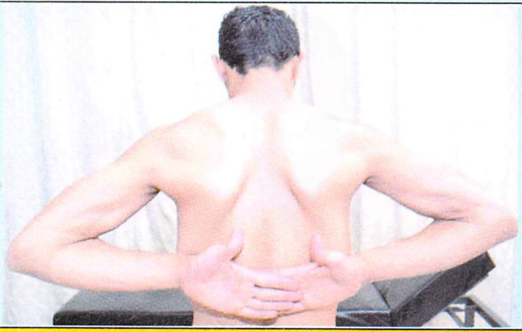
- ○ **Flexion**
  - ○ لازم ال **forearm** يلامس ال **arm** (150 درجة)
- ○ **Extension**
  - ○ لازم الكوع يتفرد 180 درجة

### 5. Shoulder :

- Ask the patient to put both hands behind the head with elbows pointing laterally (flexion, abduction & external rotation)

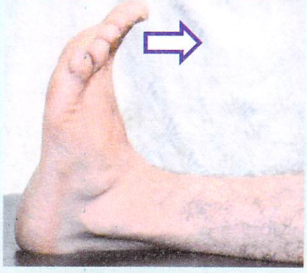


- Ask the patient to put the arms down and reach up behind the back (extension, adduction & full internal rotation)

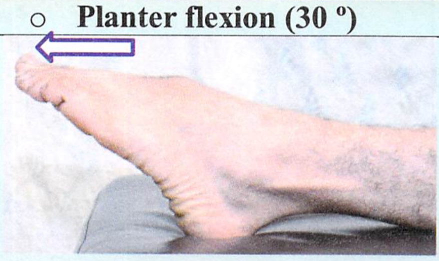


### 6. Ankles & feet

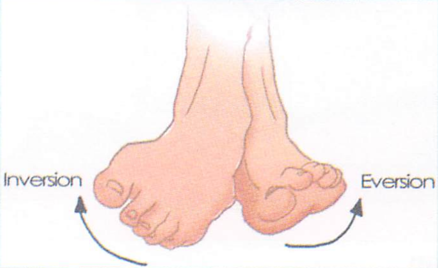
- Dorsiflexion (20°)



- Planter flexion (30 °)



- Inversion (20 °)
- Eversion (10 °)
  - At Subtalar joint



### 7. Knee : see neurology

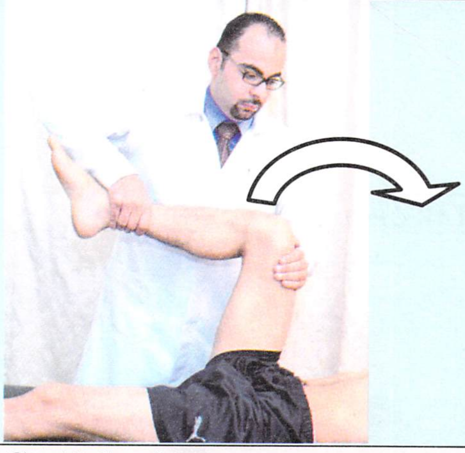
- Flexion: Ask the patient to flex each knee in turn and observe the range of movement (150°) and any signs of pain
- Extension: Ask the patient to straight each knee (180 °), place a hand on the knee to feel the crepitus

### 8. Hip; Actively : ask the patient to do the action of hip; see neurology

- Passively: as following :

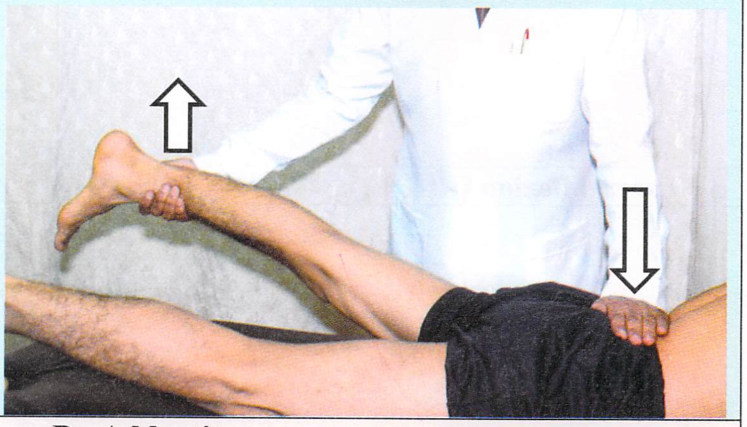
#### A. Flexion

- The patient flex his knee & move their hip into the flexed position as fair as possible (120°)



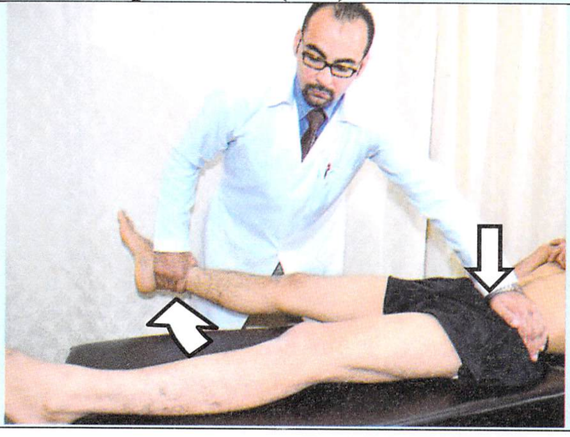
#### B. Extension

- The patient lie prone, immobilize the pelvis with one hand while extending the hip with the other hand (30°)



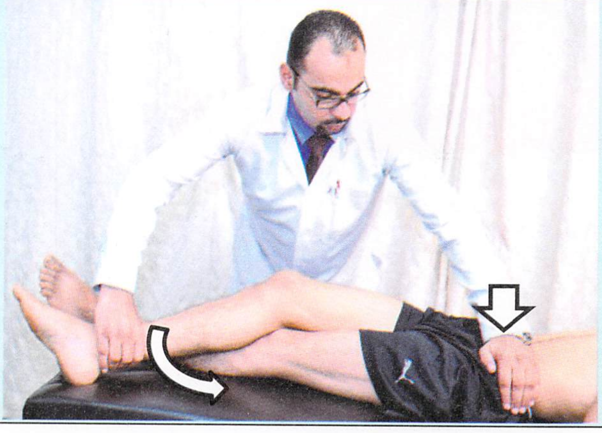
#### C. Abduction

- Make sure you stabilize the pelvis by placing a hand on the opposite ASIS and holding the ankle with the other hand. The hip is abducted until the pelvis tilts (45 °)



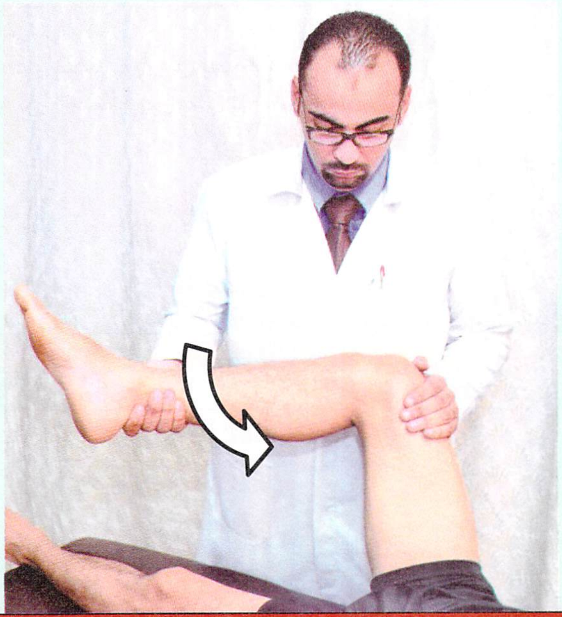
#### D. Adduction

- Make sure you stabilize the pelvis by placing a hand on the opposite ASIS and holding the ankle with the other hand. Cross one leg over the other until pelvis begins to tilt (30°)



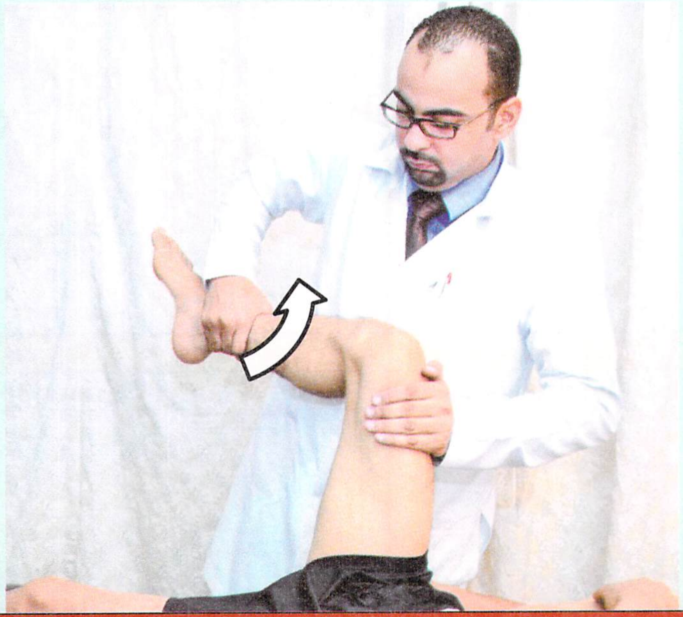
### E. External rotation

- Flex the hip and knee to 90 °, now move the leg medially (60 °)



### F. Internal rotation

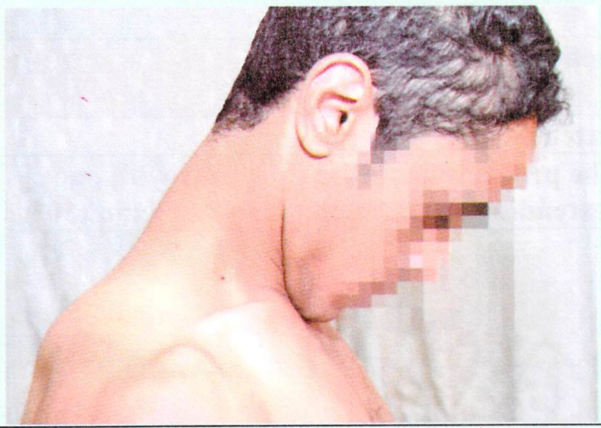
- Flex the hip and knee to 90 °, now move the leg laterally (45 °)



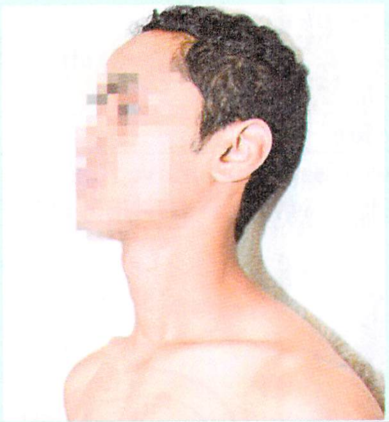
## ❖ Axial joints

### 9. Cervical spine RA affect upper cervical

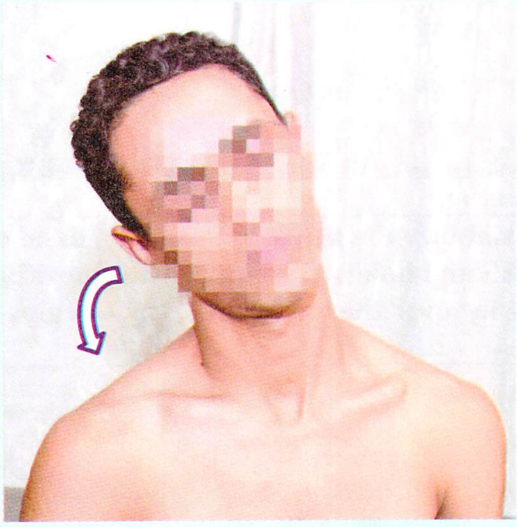
- **Flexion**
- حاول تلمس صدرك بذقنك



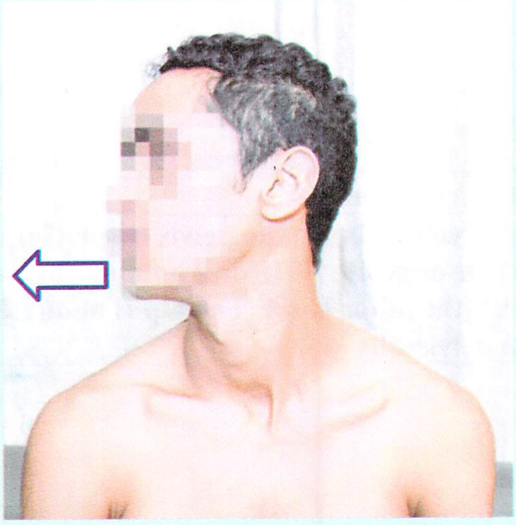
- **Extension: occiput to wall test**
- وقف العيان , ظهره لازق في الحيطة وقوله يحاول يلمس الحيطه براسه
- **Normal = 0 (occiput to wall distance)**



- **Lateral flexion (Rt& Lt):** يحاول يلمس كتافه بودانه



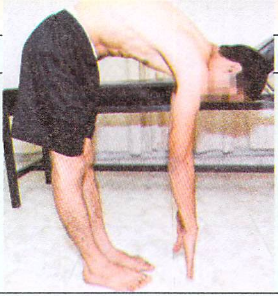
- **Rotation (Rt& Lt):** يلف رقبته شمال ويمين



## 10. Lumbar spine : OA affect cervical & lumbar

### A. Flexion:

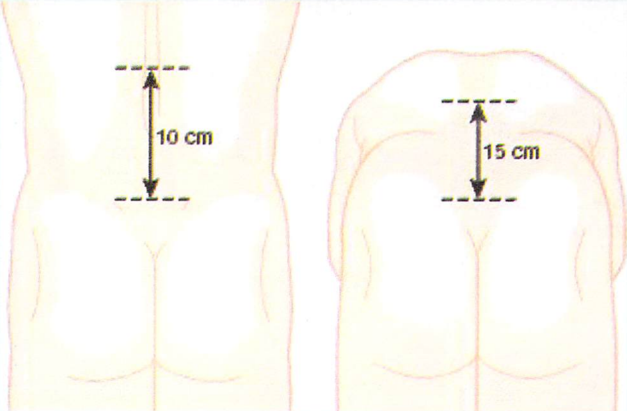
- ○ **Finger to floor test**



- ○ ضم رجليك
- ○ افرد ركبتك
- ○ حاول تلمس الأرض بصوابع إيديك
- ○ قيس المسافة بين صوابعه والارض : الطبيعي اقل من 5 سم

**I. Schober's test**: 2 points:

1. First at lumbo-sacral junction (Midway between PSIS; between 2 dimples of Venus)
2. Second above it by 10 cm



- ○ خلي العيان يقف ويكشف ظهره
- ○ حط نقطين على ظهر العيان :
  - الأولى : between 2 dimples of Venus
  - الثانية : فوق الأول ب 10 سم
- ○ قول للعيان يميل لقدام على قد ما يقدر
- ○ قيس المسافة بين الخطين مرة أخرى

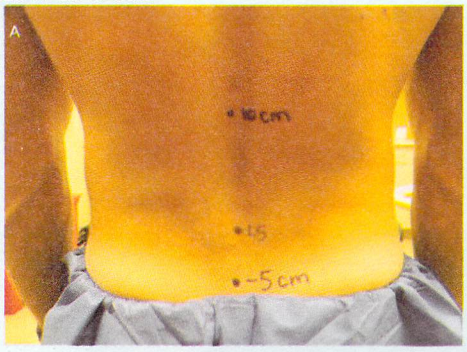
- ○ Normally 10 cm extends to 15 cm
- ○ If the distance < 15 cm → limitation

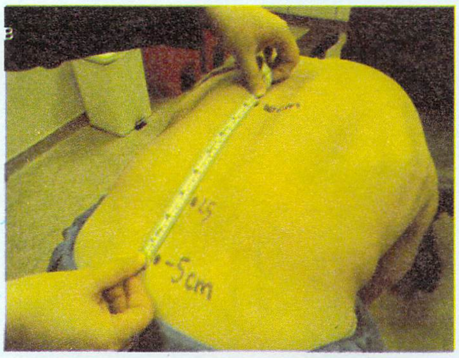
**III. Modified Modified Schober's test**: 2 points:

1. First at lumbo-sacral junction (Midway between PSIS; between 2 dimples of Venus)
2. Above it by 15 cm

**II. Modified Schober's test**: 3 points

1. First at lumbo-sacral junction (Midway between PSIS; between 2 dimples of Venus)
2. Second above it by 10 cm
3. Third below it 5 cm



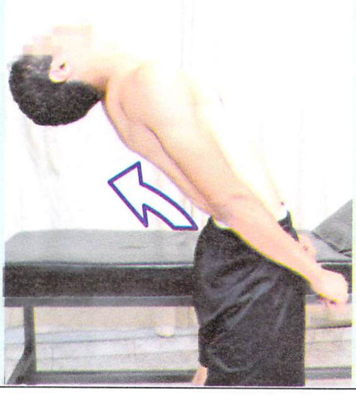


- ○ خلي العيان يقف ويكشف ظهره
- ○ حط نقطين على ظهر العيان :
  - الأولى : between 2 dimples of Venus
  - الثانية : فوق الأول ب 10 سم
  - الثالثة: تحت الأولى ب 5 سم
- ○ قول للعيان يميل لقدام على قد ما يقدر
- ○ قيس المسافة بين الخطين مرة أخرى

- ○ Normally: distance between the 2 line ≥ 15 cm
- ○ If the distance < 15 cm → limitation

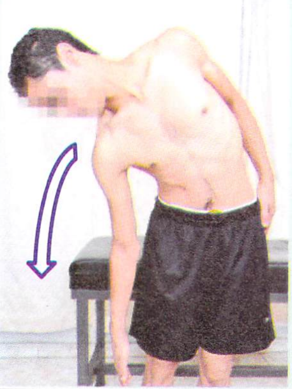
### B. Extension

- ○ وقف العيان وخليه يرجع بظهره ورا على اد ما يقدر



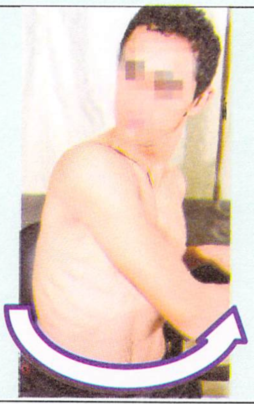
### C. Lateral flexion (Rt & Lt)

- ○ وقف العيان وقوله ايديك جنبك ... ويميل بجسمه يمين وشمال ( كأنه بيحاول يزحلق ايده لرجله)



### D. Thoraco lumbar Rotation (Rt & Lt)

- ○ قعد العيان علشان تثبت ال Pelvis
- ○ وقوله يبص لناحية كتفه بوسطه



## 11. Thoracic spine : see chest

- ○ Ankylosing spondylitis affects thoracic spine
- ○ Measurement by chest expansion by a tape at the level or below the nipple

## ❖ Special joints:

## 12. Temporomandibular:

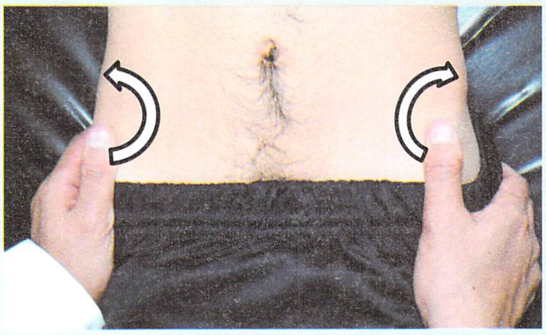
- ○ Ask the patient to open and shut , protrusion and retraction , side to side

## 13. Sacroiliac joints

- ▪ Normally: pressure over Sacroiliac joint is painless
- ▪ If pressure → pain → sacroilitis

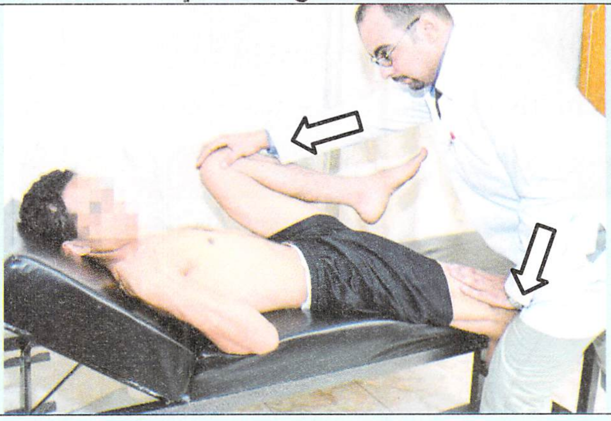
**○ Pelvic springing :**

- ○ العيان نايم على ظهره
- ○ حط إيدك على ال 2 iliac bones عند ال 2 ASIS
- ○ حاول انك open the pelvis كأنه كتاب

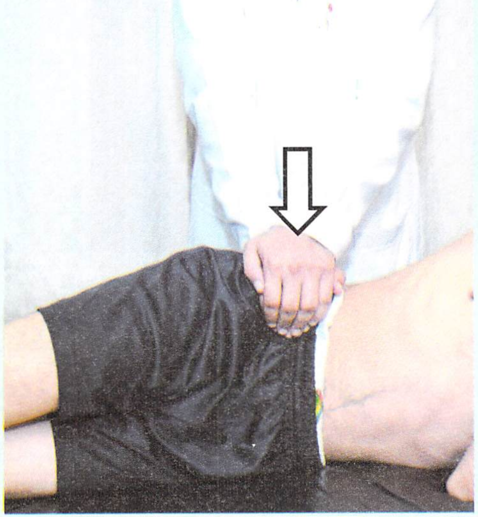


**○ Gaenslen's test:**

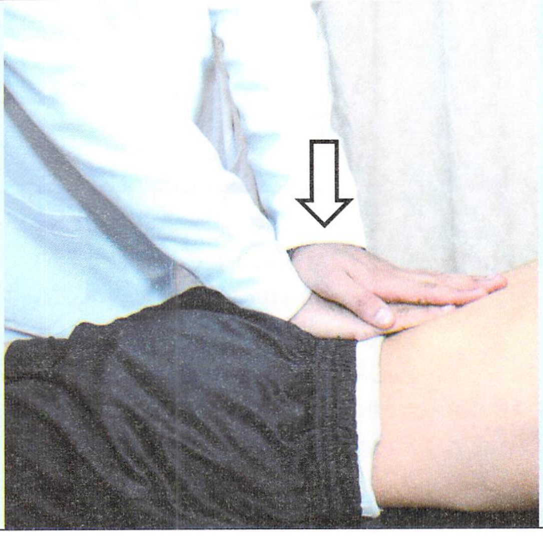
- ○ العيان نايم على ظهره
- ○ رجل مدلدلة من السرير والرجل التانيه مثنية
- ○ اضغط بايدك على رجله اللي تحت واللي فوق
- ○ خد بالك انك كده بتفحص المفصل بتاع الرجل اللي مدلدلة من السرير



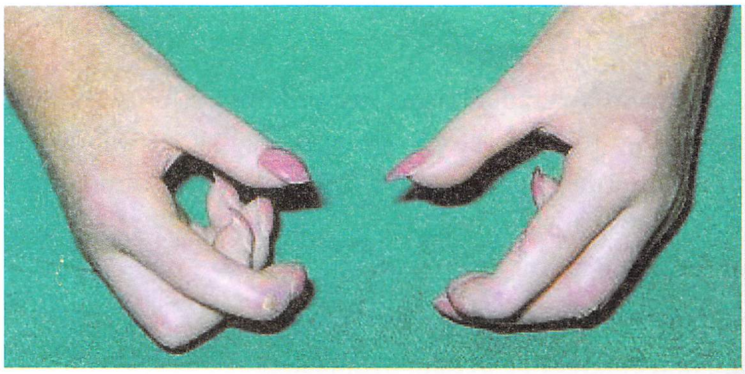
**○ Lateral side compression of the pelvis**

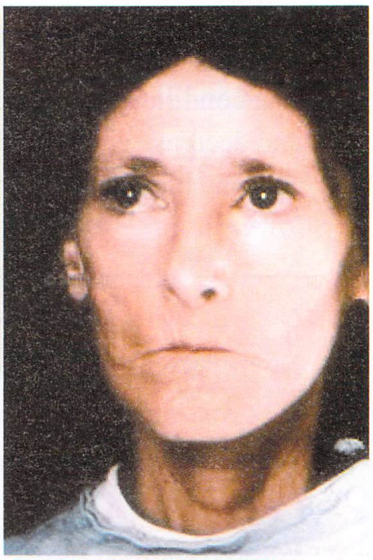


**○ Direct pressure over the sacrum**



## Scleroderma





### I. History:

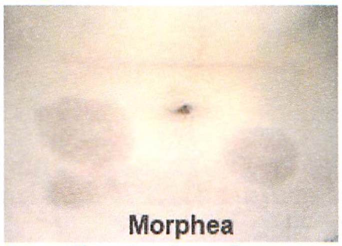
- **GIT :** dysphagia, constipation
- **Skin :** limited finger mobility
- **Joint:** arthralgia
- **Raynaud's phenomenon**

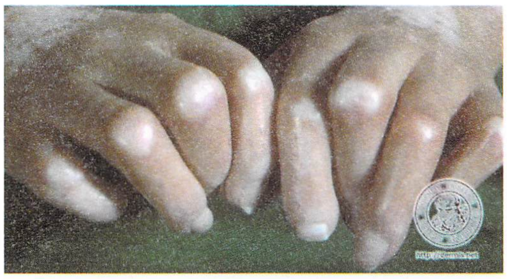
### II. Examination :

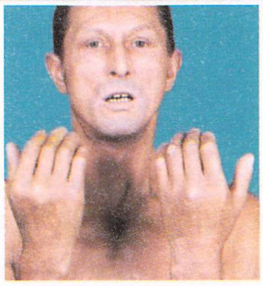
1. **Skin:**

- ○ Early : edema : swollen & shiny skin due to edema
- ○ Later: shiny, waxy, hard indurated , hairless, adherent to underlying structure, ± calcinosis, telangiectasia, ulcers & pigmentation (hyper or hypo)

❖ **Types of scleroderma:**







**A. Localized scleroderma= scleroderma without internal organ involvement :**

- ○ Morphea: circumscribed hard waxy plaque

**B. Limited scleroderma = Acrosclerosis :**

➢ **Peripheral skin affection of :**

- **Fingers of hands & feet :** swollen, shiny, limited mobility (sausage shape), pseudo-clubbing , digital infarcts, sclerodactyly
- **Face :** mask face, fish mouth, limited mouth opening , wide deformed nostrils with tipped nose & telangiectasia

➢ **Complications:** CREST Syndrome: : **C**alcionosis, **R**aynaud's, **E**sophageal hypomotility, **S**clerodactyly & **T**elangiectasia.

**C. Progressive diffuse sclerosis :**

- o Diffuse skin lesion affecting trunk & proximal limbs as well as face, distal limbs (fingers)
- o Severe internal organ damage and is generally more life threatening

**D. Systemic sclerosis sine (without) scleroderma : rare**

- o Internal organ involvement without skin manifestation

**E. Overlap syndrome (mixed connective tissue disease)**

- o Scleroderma associated with other autoimmune diseases
- o This syndrome involves mixed features of at least 2 connective tissue disorders (SLE, Scleroderma , Polymyositis)

2. **Joint examination:** swollen, tender, limited mobility.
3. **CVS :** pericarditis, effusion, cardiomyopathy with HF, corpulmonale (secondary to Pulmonary hypertension)
4. **Chest:** pleurisy, aspiration pneumonia , interstitial fibrosis.
5. **CNS :** headache & stroke during hypertensive renal crisis , myopathy
6. **GIT :** dysphagia , GORD
7. **Renal:** scleroderma renal crisis : malignant hypertension & CRF later on

# Rheumatoid arthritis

- **Personal history: …..**
- **Complaint:** pain in both hands, 10 years duration
- **HPI:**
  - The condition started 10 years ago by gradual onset and progressive course of **pain** which increase in early morning and decrease gradually with exercise, associated with **stiffness** that last for more than one hour & gradually resolves. The patient developed **marked hand and foot deformities** with loss of normal **joint function in** both upper and lower limbs.
  - No symptoms suggesting **CVS** manifestations.
  - No symptoms suugesting **chest** manifestations.
  - No symptoms suggesting **Neurological or ocular** manifestations.
  - No symptoms suggesting **anaemia**.
  - No symptoms suggesting **renal** affection.
- **Past history:** No drugs, operation, disease (DM, HPN).
- **Family history:**
  - No consanguinity.
  - No similar condition in family.
  - No common disease in family.
- **General examination:**
  - The patient is fully **conscious**, well oriented for time, place and person. Average mood and memory. The patient is co-operative with average intelligence.
  - **Temperature:** 37.2° c.
  - **Bl. Pressure:** 130/80.
  - **Resp. Rate**: 16/minute, regular, average depth, abdomino-thoracic.
  - **Pulse:** Regular, 72 beat/minute, average volume, no special character, equal on both sides, intact peripheral pulsation, vessel wall is not felt, no radiofemoral delay.
  - **The patient** looks well, average built, no cyanosis, pallor or jaundice. He is lying free flat comfortable in bed.
  - **Head & Neck** :joint exam (see later ).
  - **Upper limb:** No palmer erythema+ complete joint exam (see later).
  - **Lower Limb:** No L.L. **edema** + complete joint exam (see later).
- **Local examination :**

## I. Peripheral joints

→ **By inspection:**

1) **Deformities**

   **Big joints**: in the form of flexion deformity in both elbows .

   **Small joints** are affected in the form of:

   - **Rt. Hand**: flexion deformity at MCP joint , Fusiform deformity in the middle finger, flexion deformity at PIP joint in the little finger.
   - **Lt. hand**: Ulnar deviation of fingers at MCP joint , Swan neck deformity in index, subluxation at PIP joint in the middle finger, fusiform deformity at PIP joint in ring finger, flexion deformity at MCP joint in the little finger.
   - **Both Feet:** show flexion deformity at PIP joints.

2) **Wasting**

   - **UL**: There is bilateral wasting with guttering specially in the right hand . Both thenar eminences show flattening.
   - **LL:** medial aspects of both thighs show loss of muscle bulk.

**→ By palpation :**

- **Synovium** isn't felt by rolling.
- Both elbows and middle finger of Rt. Hand show **subluxation**.
- Mild **tenderness** at wrist, MCP, PIP.
- **Coarse Crepitus** in both elbows and knees.

**→ By combined inspection & palpation :**

- **Skin**: no erythema ,no palmar erythema ,no psoriasis ,no nail pitting ,no scars ,no warmth. or
- **Swellings:** no evidence of bursopathy, no thickened synovium , no osteophytes, no S.C nodules , no PIP , MCP ,wrist knee effusions.
- **Range of movement** :

↳ **UL:** Limitation of movement in both sides at all direction of movements both actively and passively:

- **Fingers:** flexion, extension, abduction, adduction, opposition, hand grip .
- **Wrist**: ulnar and radial deviation, flexion and extension
- **Elbow:** extension and flexion.

↳ **LL:** normal range of movement **.**

### II. Cervical and lumber vertebral column:

**→ by inspection :**

No deformity , no limitation of movement (flexion ,extension, medial and lateral rotation, right and left tilting )

**→ By palpation:**

No tenderness over cervical or lumber spines

### III. Special joints:

**A. Temperomandibular joint:**

- **Inspetion:** no erythema ,normal range of movement
- **Palpation :** no displacement, no crepitus

**B. Sacroiliac joint :**

- **No evidence of sacroiliitis**

### ❖ Other Systems

- **CVS:** search for cardiomyopathy (Systemic congestion),pericardial effusion.
- **Neuro:** search for Entrapment neuropathy, atlanto-axial subluxation.
- **Hematological:** anemia or may be pancytopenia.
- **Chest:** search for pleural effusion, fibrosis, caplan's syndrome .
- **Renal:** search for nephrotic syndrome, CRF .
- **Ocular:** scleritis ,Sjogren's syndrome.
- **Others:** myopathy ,muscle wasting ,HSM.

### ❖ Diagnosis

- **A case of chronic polyarthritis for DD most probably e.g. Rheumatoid arthritis**

? **Why polyarthritis** → **affecting of more than 4 joints group**

? **Why chronic** → **persisting for more than 6 weeks**

? **Why rheumatoid :**

**A. Articular manifestation :**

- **Distribution ….**
- **Character: morning stiffness more than 1 hour**
- **Deformities ….**

**B. Extra-articular manifestation :**

- **SC nodules**
- **Mild multisystemic affection**

**C. Type of patient :**

- Sex : female
- Age: < 40 years

**D. Associated diseases :**

- Sjogren syndrome (Sicca syndrome)
- Overlap syndrome

**E. American collage of rheumatology criteria for diagnosis RA : see before**

### ❖ How would you proceed to manage this case ?

**1. Investigation of RA:**

**A. Investigation to prove diagnosis :**

- Rheumatoid factor (non specific)
- Recent : anti CCP (specific) { Anti-citrullinated protein antibodies (ACPA) or anti-cyclic citrullinated peptide antibodies (anti-CCP)}
- X-ray for hands & feet

**B. Investigation to detect disease activity :**

- ESR
- CRP

**C. Investigation to detect extra-articular (systemic) manifestations**

**2. Treatment :**

- Anti-inflammatory: NSAIDs (aspirin, indomethacin, diclofenac, ….), Steroids.
- Disease-modifying drugs: Gold, D-penicillamine, Chloroquine, sulphasalazine, levamisol.
- Immuno-suppressive drugs: Azathioprine, methotrexate
- Other measures: intra-articular injection of cortisone, surgical (arthroplasty, arthrodesis)

# ENDOCRINOLOGY

## ACROMEGALY

- ❖ **Etiology :** Excess growth hormone:

1) Child (before closure of epiphysis) : Acidophilic cells hyperplasia → gigantism
2) Adult (After closure of epiphysis): Acidophilic cells Adenoma → Acromegaly

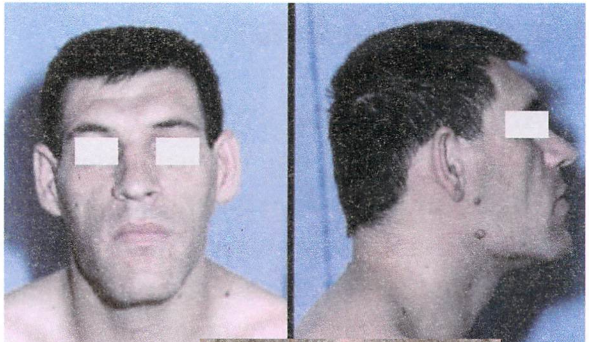
- ❖ **History :**

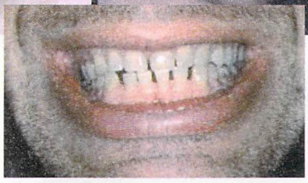
1. **Height:**
   - ○ Tall stature in gigantism (disproportionate; span > height )
   - ○ Normal in acromegaly
2. **Enlargement** of skull, tongue (sleep apnea), prominent features , husky voice
3. Frequent **change** of hats, shoes, rings (tight)
   - الخاتم بيضيق عليه , الجزمة بتضيق عليه (بيغيرها كل شهر)
4. Headache,blurring of vision, vomiting, ± convulsion, ± coma (**pressure symptoms** from tumor)
   - ▪ صداع بيزيد الصبح وترجيع مالوش علاقة بالأكل وزغللة
5. **DM** symptoms: polyuria, polydipsia, polyuria, …
6. **Other systems** :
   - ○ Heart : HF manifestations رفرفة , ورم في رجليك , نهجان
   - ○ Chest : TB
   - ○ Abdomen : abdomen distention for organomegaly
   - ○ Neurological :
     - PN & Myopathy بتحس بتنميل أو شكشكة , بتقدر تشيل الحاجة أو تطلع سلالم
     - Bitemporal hemianopia , 3rd, 4th 6th CN affection بيمشي بيخبط في الناس
   - ○ Bone & joints : osteoarthritis : pain increase with movement بتحس بوجع في مفاصلك

- ❖ **Examination :**

I. **Vital signs :**
   - ○ BP: hypertension (salt & water retention + thick arteries)

II. **General overview :**

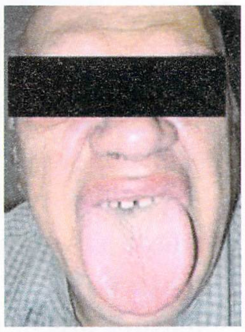


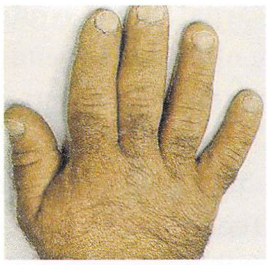


A. Tall **stature** in gigantism (disproportionate; span > height )

B. **Head: Coarse features** لو معاه صورة قديمة له قوله يطلعها وشوفها:

1. Big elongated skull
2. Prominent bony process (frontal bossing & maxillary overgrowth)
3. Prominent supraorbital ridges , infraorbital puffiness
4. Big nose & ear
5. Thickened lips
6. Effect of DM on teeth, eye, skin, …. (see later)
7. Prognathism (prominent lower jaw) with widely separated teeth (DD from familial proganthism) ,
   → *N.B.: mandible is the only bone which is capable of growth till 40 years*
8. Husky voice (thickened vocal cords)
9. True macroglossia : disproportion between mouth & tongue, **complications :**
   - ○ Traumatic ulcers (search for it)
   - ○ Difficult talking, Difficult deglutition, Dyspnea





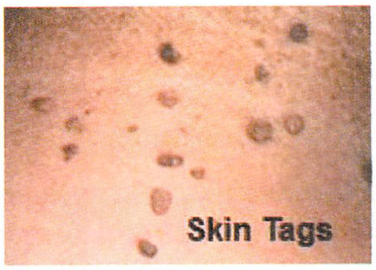
- ❖ **Mechanism of macroglossia :**
  - ▪ True macroglossia : Hypertrophy of tongue in Acromegaly
  - ▪ Pseudo macroglossia : Deposition of tissues in myxedema

10. **In nape area: wrinkled skin & folds, excess grease & sweats.**

C. **Upper, lower limbs:**
   - ○ Thick hands (spade shaped)
   - ○ Enlarged with broad fingers , thickened blunted tips (sausage shaped)
   - ○ Big feet, prominent heel (calcaneal bone)

→ N.B.: Changes in head, UL, LL are marked in acromegaly & less prominent in gigantism

**D. Skin changes :**



- Skin tags in neck , may be associated with polyposis coli (precancerous)
- Skin is thickened, thrown into folds & wrinkled (lipolysis of subcutaneous fat)
- Greasy oily skin (seborrhea) ± sebaceous cyst
- Excessive sweating ± malodorous

**E. Thyroid exam :** goiter (GH ↑ thyroid hormone; euthyroidism)

## II. Systemic examination :

**1. CVS:**

- Orthopnea due to HF as a result of HTN & Cardiomyopathy

→ *HF is the most common cause of morbidity & mortality in these cases.*

- Auscultate : weak Heart sounds & functional MR & TR

**2. Chest:**

- Auscultate for TB

**3. Abdominal:**

- Umbilical hernia , divarication of recti
- Visceromegaly e.g. hepatosplenomegaly (sonar finding)
- Colonic polyps & increased risk of colonic cancer
- Genital examination:

↳ **In males :**

- Gynecomastia & galactorrhea
- Sexually : 2 stage
  - Early : increase desire & potency due to effect of GH
  - Later: impotence due to :
    - ✓ Prolactin like action
    - ✓ Tumor destroys cells of Gonadotropin
    - ✓ DM

↳ **In females :** menstrual troubles

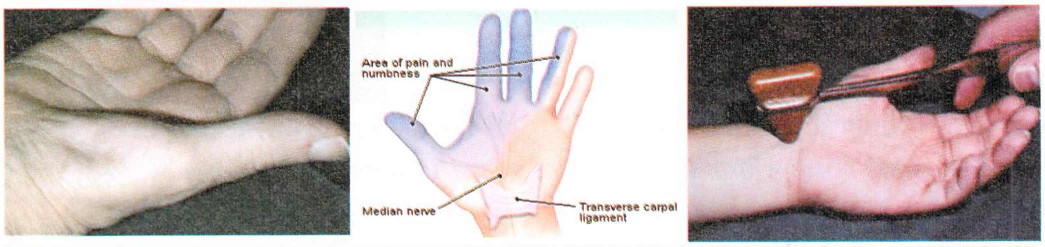
**4. CNS:**

A. **Examine ocular CN (3rd, 4th, 6th CN)** as result of pressure manifestation on optic chiasma especially field of vision (bitemporal hemianopia); confrontation test & acuity of vision.

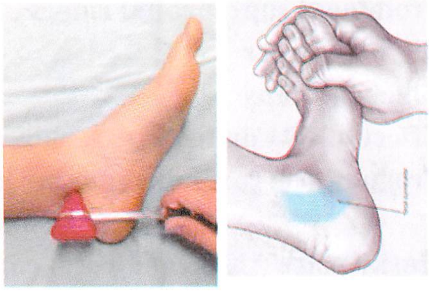
B. **Examine for Proximal Myopathy**

C. Examine for **sensation :** peripheral neuritis

- Examine for Polyneuropathy (interstitial neuropathy) : feel for **thickened nerves** e.g. Ulnar nerve
- Examine for Entrapment neuropathy : carpal tunnel syndrome (median nerve compression) & tarsal tunnel syndrome (posterior tibial nerve compression) :



Carpal tunnel syndrome



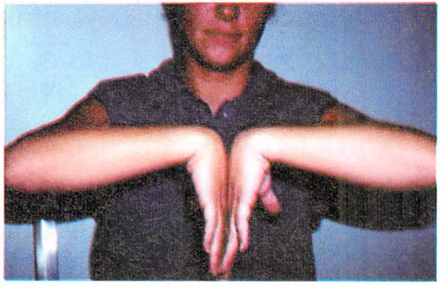
Tarsal tunnel syndrome

❖ **Signs for diagnosis of carpal tunnel syndrome**

i. **Inspection:** wasting of the thenar eminence

ii. **Motor power:** abductor pollicis test: weakness of thumb movement ( see neurology chapter)

iii. **Sensory :**



- Sensory loss of the first 3 fingers & half of the ring finer
- Numbness & pain reproduced by stressing on median nerve by either:
  - Tinel's sign: percuss with a hammer on flexor retinaculum
  - Phalen's sign : severe flexion of wrist for 1 minute عكس الهندي

iv. **Feature of the cause** e.g. Acromegaly, { others : Myxedema, DM, RA}

**5. Joint :** Osteoarthritis; knee crepitus, kyphosis

❖ **Diagnosis of acromegaly :**

- A case of acromegaly most probably due to pituitary adenoma (successfully surgically treated by trans-sphenoidal hypophysectomy)

❖ **Why acromegaly :**

1. Features : head …. , limbs … ,
2. Signs of increased GH on skin, CVS, CNS, Abdomen, Gonads, … etc.

❖ **Why pituitary adenoma :** local tumor manifestation (headache, field defect)

❖ **Diagnosis of Gigantism :**

- A case of tall stature for DD most probably pituitary gigantism (successfully treated by irradiation)

❖ **Why pituitary :** evidence of increased growth hormone

❖ **What are the DD of tall stature :**

  - Constitutional : familial & racial
  - Pituitary gigantism
  - Hypogonadism
  - Marfan's syndrome
  - Kleinfelter's syndrome
  - Soto's syndrome (cerebral gigantism)

## Cushing syndrome

❖ **Etiology:** ↑ cortisol due to :

1. **Endogenous causes:**

| A. Cortical tumor (20%)<br>• Cushing's syndrome | B. Pituitary tumor (70%)<br>• Cushing's disease | C. Para-malignant syndrome (10%) |
|---|---|---|
| ○ Abdominal mass | ○ Micro-tumor→ NO manifestation of ↑ ICT | ○ Bronchogenic carcinoma<br>○ Ovarian neoplasm |
| ○ ↓ ACTH (no pigmentation) | ○ ↑ACTH + Pigmentation | |

2. **Exogenous causes; Cushingoid disease:** iatrogenic in patients taking cortisone in large amount for long duration e.g.:

| • Rheumatic fever | • Bronchial asthma | • Nephrotic syndrome | • RA, SLE |
|---|---|---|---|

❖ **History:**

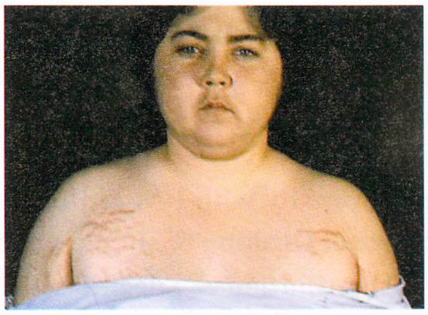
1. Type of patient : female, 30-40 years old, gradual onset, slowly progressive course:

- Excess weight gain (Obesity)
  ↲ زيادة وزن
- DM : polyuria, polydipsia, polyphagia
  ↲ عطش وجوع وبول كتير
- Hypertension:
  ↲ صداع وزغللة ووش في ودانك أو نزيف من مناخيرك
- Skin changes
- Recent Pigmentation (Pituitary or Para-malignant causes)
- Depression → suicidal attacks
- Secondary myopathy : متقدرش تطلع السلم
- Osteoporosis: bone pain, pathological fracture
- Chest TB : ↓ resistance
- Decrease libido in both sexes
- Impotence in males
- Amenorrhea in females

2. Past history: History of drug intake & history of this disease : diseases treated by cortisone:

○ Rheumatic fever, bronchial asthma, nephrotic syndrome, RA, SLE

3. Family history : obesity, hirsutism



❖ **Examination :**

I. **Vital signs :**

  1. Hypertension "salt & water retention"
  2. Fever 2ry to infection

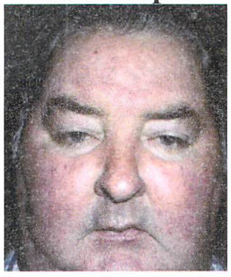
## II. General overview :

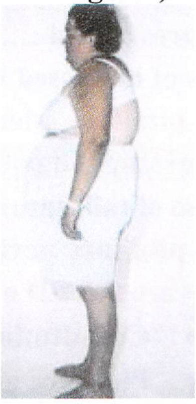
**A. Stunted growth in children**

**B. Cushingoid feature :**

1. **Moon face** i.e. rounded face with bloated cheeks (deposition of fat on the temporal & buccal regions)
2. **Plethoric face :** 2ry polycythemia
3. **Trunkal obesity or centripetal obesity** (samboxa shaped obesity):
   - Fat deposition in breast & abdomen
   - Not in buttocks → sunken buttocks
   - Thin limbs
4. **Supraclavicular pad of fat**
5. **Buffalo hump** (fat deposition in interscapular & dorsocervical region ) + kyphosis

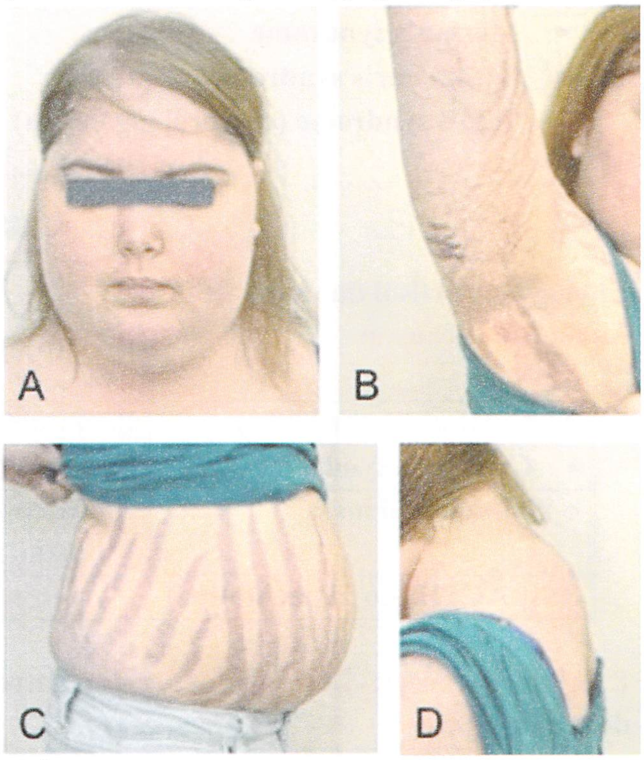
**C. Effect of DM on** teeth, eye, skin, …. (see later)





**D. Skin changes :**

- Thin skin : examine the skin fold on the dorsum of the hand (visible veins & cigarette paper sign)
- Skin ulcers, infections
- Vascular purpura & skin bruises
- Pigmentation (Pituitary or Para-malignant causes)
- Stria rubra (search for it in arms , breast, abdomen , thighs)
- Stria alba because of rapid ↑ increase of abdomen
- Effect of DM on skin, …. (see later)
- Hirsutism in females, Baldness in males,
- Acne Vulgaris in both sexes.



## III. Systemic examination :

**1. CVS:**

- Hypertensive complications (LV enlargement + LVF)
- Rheumatic fever (as a cause)

**2. Chest:**

- Bronchogenic carcinoma, bronchial asthma (as a cause)
- Full examination for infections especially TB (crepitation & bronchial breathing)

**3. Abdominal:**

- Skin changes (see before), Bleeding tendency (vascular purpura)
- Pot belly abdomen, gynecomastia, Fatty liver
- Adrenal cortical tumors may be palpated as abdominal mass; suprarenal mass (as a cause)
- Genital examination :

| Male | Female |
|---|---|
| • Decrease libido in both sexes | |
| • Impotence | • Amenorrhea |

**4. CNS:**

- Examine **mentality** for psychosis mainly depression
- Muscle wasting & Secondary **myopathy** (Weakness of LMNL)
- DM: **neuropathy** : peripheral neuritis : superficial sensory loss, deep sensory loss (ataxia)

**5. Joint :**

- Osteoporosis : tender spine , deformities
- Stunted growth in young children.

❖ **Diagnosis:** a case of obesity most probably Cushing's syndrome, most probably due to … (e.g. pituitary tumor in case of pigmentation )

Or

❖ A case of obesity with DM & HTN most probably cushingoid due to treatment

❖ **DD between** Cushing & simple obesity associated with HTN & DM

- Fat distribution & Specific associations : striae rubra, purpura , myopathy, osteoporosis

# Addison's disease (Hypocorticism)

## ❖ Etiology :

1. Surgical: Removal of supra-renal cortex
2. Irradiation
3. Diseases : auto-immune & TB, sarcoidosis , hemochromatosis

## ❖ History:

| | |
|---|---|
| • Asthenia, Marked weakness, fatigue, decreased weight<br>↲ هفتان وبيخس , همدان , ما يعرفش يتحرك من مكانه<br>• Hypotension : Craving for salts "pathognomonic"<br>↲ ليس له أعراض ماعدا يتوحم على الملح | • Postural hypotension up to syncopal attack<br>↲ لو قعدت أو قمت فجأة أدوخ<br>• Marked hypoglycemia : craving for eating especially sugar<br>- Headache, blurring of vision, drowsiness , hunger pain<br>↲ صداع وزغلله ودوخه وبطنه توجعه |
| • Generalized pigmentation; tanning of skin<br>↲ لونه بيغمق<br>• GIT upset: anorexia, nausea, vomiting, diarrhea, polyuria | • Evidence of TB :<br>- Chest: history of TB in secondary Addison<br>- Pain in the renal angle in TB nephritis |

- History of adrenal crisis : shock , hospitalization & fluid replacement.
- Past history : History for operation adrenalectomy for treatment of Cushing's syndrome

## ❖ Examination :

### I. Vital signs :

- **Marked hypotension :**
  - Never diagnose Addison's with systolic blood pressure more than 110
- **Postural hypotension:**

قيس الضغط مرتين : مرة وهو نايم ومرة وهو واقف : هتلاقي :

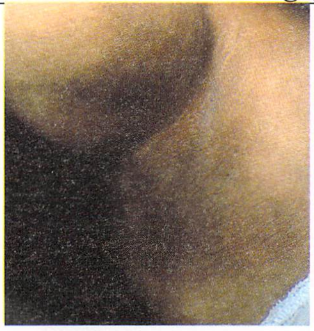
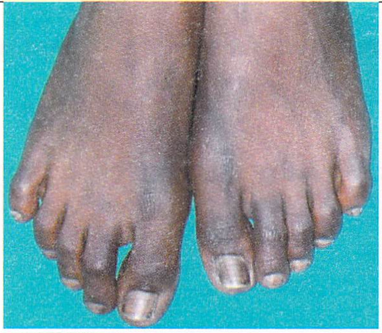
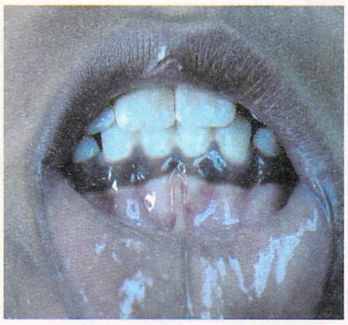
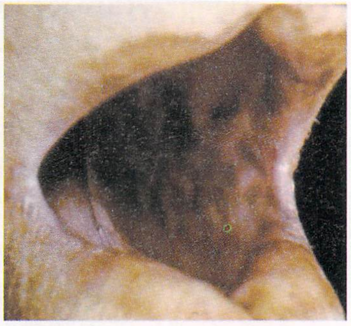
- Systolic blood pressure decreased by ≥ 20 mmHg or Diastolic blood pressure decreased by ≥ 10 mmHg

### II. General overview :

**A. Weight loss**

**B. Skin changes :**

- Vitiligo in autoimmune
- Generalized Hyperpigmentation :

| ❖ Sites & color : | |
|---|---|
| I. Skin : Tanning (dark brown) | II. Mucous membrane : Slate coloured بنفسجي محمر |
|   |   |
| 1. Exposed to sun light :<br>• Face, neck, neck lace, Dorsum of hands<br>2. Pressure areas:<br>• Elbow , knee, extensor surface of limbs<br>3. Friction area :<br>• Axilla, inner thigh<br>4. Previously pigmented area became more pigmented :<br>• Areola, nipple , umbilicus<br>5. Scars (recently only)<br>6. Hands:<br>• Palm : palmer creases<br>• Dorsum : knuckles , nail folds | 1. Inner side of lips<br>2. Gums<br>3. Buccal mucosa i.e. inner side of cheeks<br>↳ DD with Peutz-Jeghers syndrome: benign hamartomatous polyps in the gastrointestinal tract (GIT bleeding) and hyperpigmented macules on the lips and oral mucosa<br>4. Palate<br>5. Tongue<br>6. Rectal mucosa (by proctoscope) |

**III. Systemic examination :**

1. **Chest:** to exclude TB (fibrosis, cavity or infection )
2. **Abdominal:**
   - Examine for loss of pubic & axillary hair in secondary forms of adrenal insufficiency
   - Renal angle tenderness in miliary TB
   - Scar of operation of adrenalectomy

**❖ Diagnosis :**

- A case of hyperpigmentation with asthenia & hypotension for DD most probably Addison's most probably due to TB

**❖ Why Addison's :**

1. Distribution of pigmentation specially MM
2. Specific association : postural hypotension

❖ **DD of Addison's** = causes of generalized pigmentation : see general chapter

## Diabetes mellitus

**❖ History :**

- Polyuria & nocturia
- Polydipsia (excessive thirst)
- Polyphagia + weight loss
- Pruritis (monilia)
- Pains & paresthesia : Peripheral neuritis
- Premature loosening of teeth
- Blurred vision
- Impotence , urinary incontinence
- Ask about time (onset) of development of DM : type I, type II
- Ask about symptoms of other systems *"complications"*
- Ask about family history
- Ask about secondary causes :
  - Pancreatic causes : chronic pancreatitis
  - Endocrinal causes : ↑ anti-insulin e.g. Cushing, pheochromocytoma
  - Others : liver cirrhosis - drugs (steroids - thiazide) - Friedriech's ataxia

Thirst

Excess urine

Hunger

FOCUS
FOCUS
FOCUS
FOCUS
FOCUS

Blurred vision

**❖ Examination :**

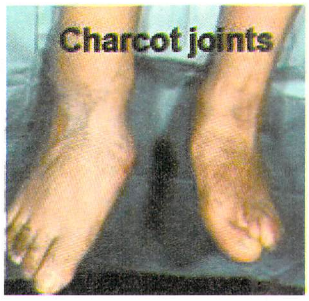
**I. Vital signs :**

1. **Temperature** for infection
2. **Respirator rate :** Kussmaul breathing: deep rapid breathing (Air hunger), Acetone smell in DKA
3. **Blood pressure:**
   - BP hypertension (early atherosclerosis)
   - Postural hypotension due to autonomic neuropathy : Measure BP both erect & supine
4. **Pulse :**
   - Rapid weak in dehydration
   - Rapid strong in hypoglycemia
   - Peripheral pulse for ischemia

**II. General overview :**

**A. Body :**

- **Appearance :** emaciated in long standing DM
- **Built:** Under built in IDDM , overbuilt in NIDDM
- **Conscious level :** coma, drowsiness in hypo or hyperglycemia
- **Decubitus:** orthopenic in left sided HF secondary to diabetic cardiomyopathy
- **Expression :** as an association e.g. Cushing syndrome

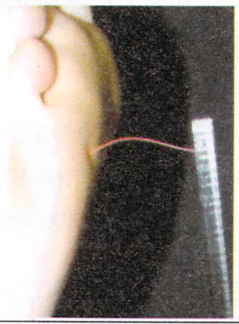


**B. Head & neck :**

- **Eye :** Xanthomatosis , blepharitis, conjunctivitis , cataract
- **Mouth :** beefy tongue , gingivitis, dental caries, loosening of teeth & dry tongue & acetone odor in mouth
- **Neck vein :** for congested pulsating neck vein in cardiomyopathy heart failure

### C. Upper, lower limbs:

- Dupuytrene contracture
- Trigger finger: when you try to straighten your finger, it will lock or catch before popping out straight
- Charcot joints "neuroarthropathy" : non-infectious destruction of bone & joints associated with neuropathy
- Wasting of small muscles of the hand
- Tremors in hypoglycemia, sweaty hands, interdigital fungal infection in nails, trophic changes or ulcers (2ry to neuropathy)
- LL oedema , trophic changes , ischemia (pain, pallor, coldness , intermittent claudication)
- Monofilament test:
  - A standardized filament is pressed against part of the foot.
  - When the filament bends, its tip is exerting a pressure of 10 grams (therefore this monofilament is often referred to as the 10 gram monofilament).
  - If the patient cannot feel the monofilament at certain specified sites on the foot, he/she has lost enough sensation to be at risk of developing a neuropathic ulcer.



### D. Skin changes :

| ○ Diabetic dermopathy | ○ Necrobiosis lipoidica diabeticorum | ○ Bullosis diabeticorum | ○ Acanthosis nigricans |
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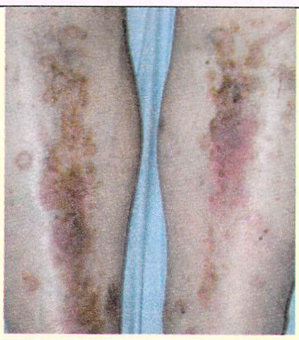
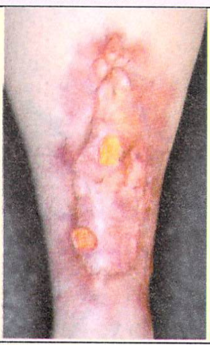
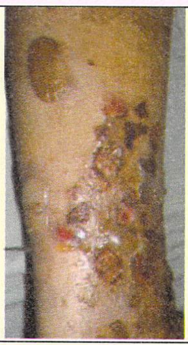
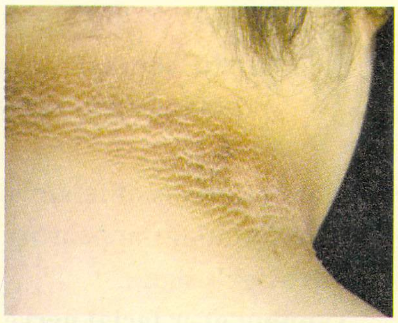
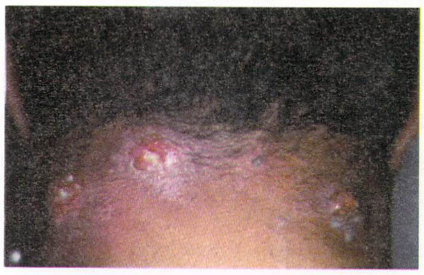
|  |  |  |  |
| ○ Red painless papules over chin of tibia & may ulcerate , due to occlusion of the cutaneous blood vessels | ○ Red painless papules with yellow center over chin of tibia & may ulcerate, due to microangipathy & fat deposition | ○ Non inflammatory, spontaneous, painless blister, often in acral locations (peripheral body parts, such as feet, toes, hands, fingers, ears or nose) | ○ Hyper pigmented (brown to black) velvety patches over the neck, axilla & ano-gential region, due to insulin spillover into the skin (due to excess insulin in insulin resistance) |



- Vitiligo
- Infections e.g.
  - Carbuncles & furuncles in the back
  - Monilia infection (pruritus) : under breast, axilla, buttocks, groin
- Delayed healing of wounds
- Xanthomata
- Carotinema
- Cutaneous features of diabetic foot e.g. colour changes , trophic ulcers & gangrene
- Complication of treatment e.g. Insulin injection sites & insulin lipodystrophy (atrophy of SC fat at sites of injections forming skin dimples

## III. Systemic examination :

### 1. CVS:

- Anginal pain , Accentuated S1 (hypertension) , cardiomyopathy : dilated enlarged heart

### 2. Chest: effusion, cavity , fibrosis , for infection esp. TB, (TB follows DM as its shadow )

### 3. Abdominal:

- Fatty liver, Diabetic glomerulosclerosis
- Dyspepsia, nausea, vomiting, diarrhea, abdominal pain (DKA)
- Liver manifestation : pain & gall stones (chronic cholecystitis)
- Genital examination:
  - Impotence in males
  - Sterility , abortion, premature labour , big babies in females

### 4. CNS: see neurology chapter

# Tetany

- ❖ **Normal calcium level:** 8.5 – 10.5 mg%

1. **Ionized (active):** 50%
2. **Non ionized (reserve):** 50 % :
    - 40 % bound to albumin
    - 10 % any other bond (Ca carbonate, phosphate, ….)

- ❖ **Tetany :** state of ↑ neuro-muscular irritability due to ↓ ionized Ca, ↓ Mg or alkalosis
- ❖ **History:**

1) **Hypocalcemia :**
    - Hypoparathyroidism : Thyroid surgery (neck scar), Neck irradiation
    - Mal-absorption syndrome, Acute pancreatitis , Chronic renal failure
2) **Hypomagnesemia :** excess diuretics , mal-absorption syndrome
3) **Alkalosis :**

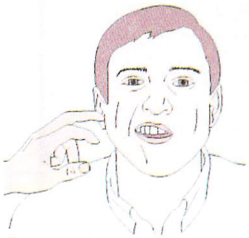
| ○ Hypokalemia e.g. Conn's syndrome | ○ Excess antacid in duodenal ulcer | ○ Repeated vomiting |
|---|---|---|

- ❖ **Examination :**

I. **Vital signs :**
  - ○ BP measurement precipitate to carpal spasm "Trousseau sign", So Ca++ is given before
  - ○ Hypotension 2ry to hypocalcemia

II. **Clinical picture of latent tetany : serum Ca = 7-9 mg%**

- ❖ Manifestations of tetany are absent
- ❖ Manifestations appear by provocative tests:

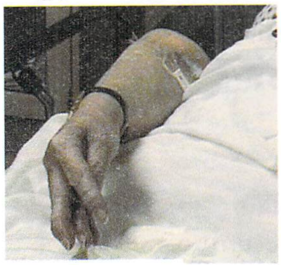


A. **Chvostek's sign :**
- ○ Tapping over facial nerve (in front of ear) causes contraction of facial muscles
- ○ Tapping over peroneal muscle causes contraction of peroneal ms (peroneal sign)

B. **Trousseau's sign :** ↑ BP above systolic on brachial artery for 3 minute causes carpal spasm

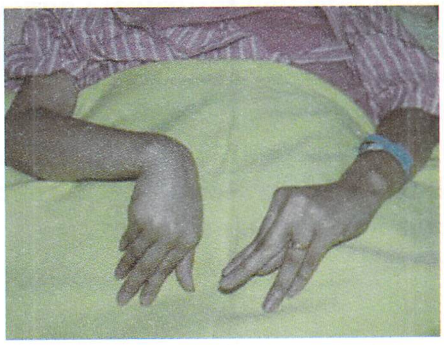
C. **Erb's sign :** Current < 4 milli-amperes causes muscles contraction (normally 8 m. Amp)

III. **Clinical picture of manifest tetany : serum Ca < 7mg %**



A. **Nerves :**
- ○ Irritability & Parasthesia : numbness & tingling in perioral area, fingers & toes

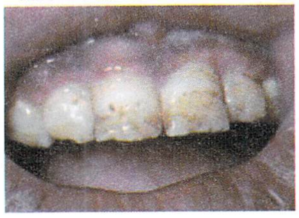
B. **Muscles : muscles twitches & convulsion**
- ❖ Muscles spasm :
- ○ CARPOPEDAL SPASM:
  - Carpo : flexion of wrist, flexion of MCP joint & extension of PIP & DIP joints, thumb adducted
  - Pedal : planter flexion & inversion



- ○ Eye: dryness, blepharospasm
- ○ Facial & master muscles : risus sardonicus & trismus (lock jaw)
- ○ Laryngeal muscles : laryngismus stridulus
- ○ Diaphragm : hiccough
- ○ GIT : abdominal colics
- ○ Back muscles : opithotonous position

C. **All provocative tests are +ve & hyperreflexia**

D. **Ectodermal changes in hypoparathyroidism only :**
- ○ Teeth: hypoplastic, transverse furrows & punctate holes if the condition started before formation of permanent teeth



- ○ Skin: dry, rough, atrophy, ulceration & monilia infection
- ○ Loss of hair & alopecia
- ○ Nails: brittle + striated, loss of luster
- ○ Lens : cataract

- ❖ **Diagnosis :**

- Recurrent cramps of hands & feet for DD most probably tetany due to hypoparathyroidism

# Dwarfism, Stunted growth, Short Stature

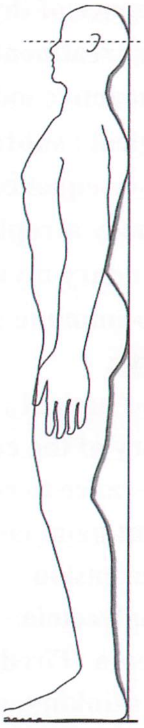
❖ **Height :** is measured form growth curve (it ranges between 3rd & 97th percentile of same age & sex)

**A. The height and span are equal (proportionate ):**

- **The height :** distance from occiput to heel in upright position:
  - The head is positioned properly : neutral position & looking straight
  - The shoulders, buttocks & heels touching the measurement surface
  - Arms at sides
  - Legs straight & knee together
  - Feet flat, The heels are almost together
- **Span :** the distance between the tip of middle fingers with outstretched hands

**B. Lower and upper segment are usually equal :**

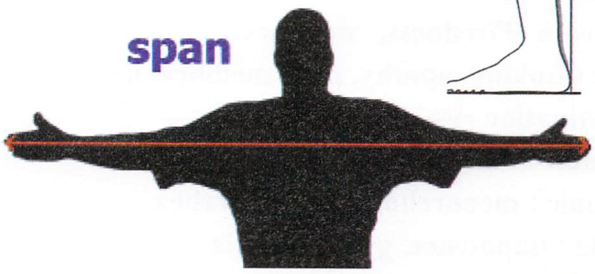
- **Upper segment :** distance from the occiput to the symphysis pubis
- **Lower segment :** distance from symphysis pubis to the floor



❖ **Short stature "dwarfism":**

- Height below 3rd percentile of normal people of their own age & sex
- Short stature + lack of sexual development = infantilism

❖ **Causes of dwarfism :**



**1. Chronic illness :**

- Bilharziasis
- Chronic heart disease : F4
- Chest disease : polycystic lung
- Chronic nephritis

**2. Endocrine:**

a) **Familial & constitutional :** the commonest

b) **↓ Growth hormone :**

- ○ Pituitary dwarfism : Levi-Lorain syndrome: Proportionate dwarfism + hypogonadism
- ○ Hypothalamic syndrome: Frohlich's syndrome : hypogonadism + obesity + somnolence, diabetes insipidus, hyperphagia

c) **↓ T4 = cretinism :** mental retardation, stunted growth & disproportionate dwarfism (span > height)

d) **↑ Sex hormones :** precocious puberty ( premature fusion of epiphysis).

e) **↑ Cortisol :** Cushing syndrome or excess steroid treatment (cortisol block the ability of GH to produce somatomedin, a hepatic peptide responsible for bone growth)

f) **↑ Blood sugar :** DM since childhood

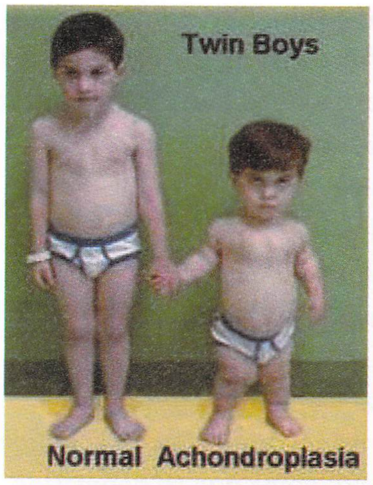
**3. Skeletal disorder:**

a) **Acquired:**

- Rickets
- Pott's disease TB spine may end in severe kyphoscoliosis & dwarfism

b) **Genetic:**

1. **Achondroplasia :**
   - ○ Limbs: short
   - ○ Trunk : normal
   - ○ Face is small compared with vault of skull , sexual development normal
2. **Osteochondrodystrophies:** limbs & trunk : short & deformed
3. **Osteogenesis imperfecta :**
   - ○ Bones are flattened, deformed due to repeated fractures
   - ○ Blue sclera & conductive deafness
4. **Turner's syndrome :** dwarfism + primary amenorhoea, webbing of neck.
5. **Mongolism :**
   - ○ Mental deficiency , Narrow eye - slits which are also sloped outwards& Deep fissured tongue



# **Myxedema;** hypothyroidism in adults

## ❖ Etiology :

**A. Consequence of thyrotoxicosis :**

- Drug treatment by anti-thyroid drugs
- Radioactive iodine
- Surgical : subtotal thyroidectomy

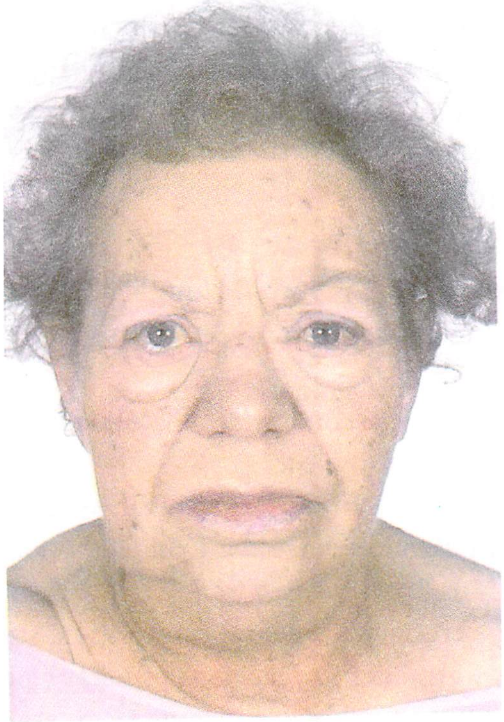
**B. Non - Consequence of thyrotoxicosis:**

- Primary atrophy: idiopathic (commonest)
- Secondary myxedema : due to pituitary failure
- Auto-immune : Hashimoto thyroiditis ( & vitiligo)

## ❖ History :

❖ **Type of patient :** female, 30-40 years old, gradual onset, slowly progressive course

1. History of the cause : drug intake, radioactive iodine & surgical treatment
2. Intolerance to cold بتحبي الشتا ولا الصيف : هتقولك بحب الصيف علشان ببرد أوي في الشتا
3. Weight gain, loss of appetite
4. Hypertension
5. Hypoglycemia
6. Asthenia :Tiredness, weakness
7. Slow thinking, apathy, poor memory, hypersomnia
8. Constipation لازم حقنة شرجية علشان أعمل حمام , dyspepsia
9. Genital:
   - Female : menorrhagia, galactorrhea
   - Male : impotence, gynecomastia



## ❖ Examination :

**I. Vital signs :**

- Temperature: hypothermia (normal if treated by thyroxin)
- Pulse : bradycardia (normal if treated by thyroxin)
- BP : hypertension (normal if treated by thyroxin)

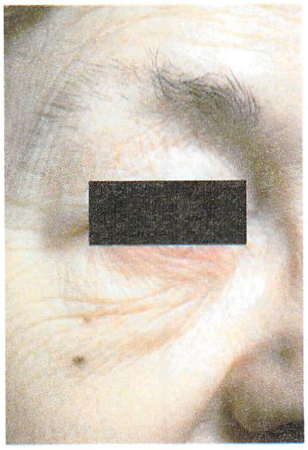
**II. General overview :**

**A. Sign for cold intolerance :** heavy clothes

**B. Overbuilt : weight gain**

**C. Head:**

- Appearance : Puffy face, expressionless, bloated , malar flush
- Hair : thin, dry, alopecia
- Puffiness of upper eye lid due to periorbital odema
- Eyes : sparse hair, loss of outer 1/3 of eye brow + cataract
- Xanthlasma
- **Mouth :**
  - Thick lips
  - Pallor due to :
    - *Anemia (all types),*
    - *V.C.*
    - *Myxedematous deposition*
    - *Carotinema → ↓thyroxin which metabolize carotin*
  - Husky voice due to deposition of myxedematous tissue on vocal cords
  - Pseudo macroglossia (thick, protruded) : disproportion between mouth & tongue, **complications :**
    - Traumatic ulcers (search for it)
    - Difficult talking, Difficult deglutition, Dyspnea



[redacted]

**D. Upper, lower limbs:**

- Non pitting oedema due to intradermal accumulation of proteins

**E. Skin changes :**

- Cold, yellowish discoloration due carotenemia , pale due to anemia
- Thickened skin, non-sweaty
- Dry, rough, scaly
- Vitiligo in autoimmune cases
- Thick nail, hair is sparse

**F. Thyroid exam :** For etiology

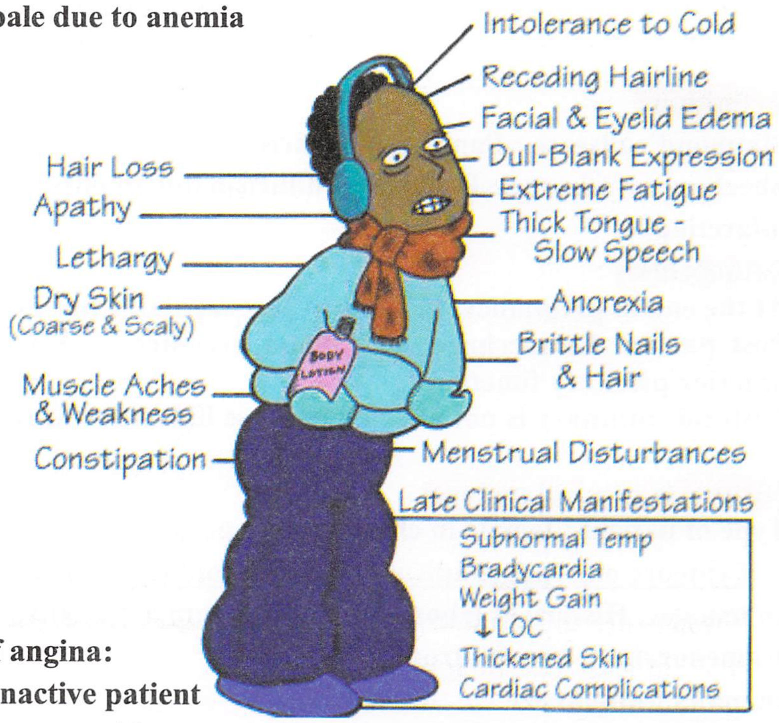
- Scar in previous operation: thyroidectomy
- Firm, diffusely enlarged : Hashimoto's
- ↓ in idiopathic atrophy

## III. Systemic examination :

**1. CVS:**

→ *CVS is the commonest cause of mortality*

- Hypertension
- Sinus bradycardia
- Pericardial effusion
- Coronary heart disease but without symptoms of angina:
  - ↳ Why asymptomatic ? → Inactive heart & inactive patient
  - ↳ When symptoms appears ? → Symptoms appear with treatment, so increase dose very gradually
- Cardiomegaly : cardiomyopathy - cholesterol pericardial effusion


Intolerance to Cold
Receding Hairline
Facial & Eyelid Edema
Dull-Blank Expression
Extreme Fatigue
Thick Tongue - Slow Speech
Anorexia
Brittle Nails & Hair
Menstrual Disturbances
Hair Loss
Apathy
Lethargy
Dry Skin (Coarse & Scaly)
Muscle Aches & Weakness
Constipation
BODY LOTION
Late Clinical Manifestations
Subnormal Temp
Bradycardia
Weight Gain
↓LOC
Thickened Skin
Cardiac Complications

**2. Chest:**

- Auscultate for pleural effusion

**3. Abdominal:**

- Constipation → abdominal distention → stria alba
- Enlarged liver "fatty liver"
- Genital examination:
  - *Normal genitalia (no atrophy) & Normal 2ry sexual hair (suprapubic & axillary)*

**4. CNS:**

**A. Mentality :**

- Slow cerebration, apathy
- Slow movement , slow response to stimuli, slow talking, slow thinking , decrease memory
- Myxedema madness : psychosis , depression

**B. Speech :** slurred speech, hoarse voice

**C. Conductive deafness** due to deposition of myxedematous tissue in auditory canal

**D. Examine for Proximal Myopathy**

**E.** Examine for **sensation :** peripheral neuritis

- Examine for Polyneuropathy (interstitial neuropathy) : feel for **thickened nerves** e.g. Ulnar nerve
- Examine for Entrapment neuropathy : carpal tunnel syndrome & tarsal tunnel syndrome:

❖ **Signs for diagnosis of carpal tunnel syndrome : see before.**

**F. Hyporeflexia : Delayed relaxation** time of reflexes i.e. suspended jerk

**5. Joint :** Osteoarthritis; knee crepitus

## ❖ Diagnosis :

- A case of obesity with HTN & neurological manifestation most probably myxedema , most probably autoimmune

**↳ Why : myxedema:**

📖 From history & examination:

A. Evidence of thyroxin deficiency
B. Evidence of deposition of myxedematous tissue
C. Specific : delayed relaxation time of reflexes

**↳ Why autoimmune :**

A. Exclude iatrogenic causes
B. Associated endocrinopathies e.g. Dm
C. Trial for corticosteroid

# Sheehan's Syndrome

❖ **Definition :**

- **Simmond's disease :** Panhypopituitarism due to any cause
- **Sheehan's syndrome :** Panhypopituitarism due to post partum hemorrhage "post-partum pituitary infarction"

❖ **Pathogenesis** :

- At the end of pregnancy, blood is hypercoagulable but blood vessels dilated → no thrombosis
- Post partum hemorrhage → ↓ blood pressure → V.C. → coagulation → pituitary infraction → loss of anterior pituitary function
- Posterior pituitary is not affected because blood flow increase to posterior pituitary for lactation

❖ **History & Clinical picture:**

- Type of patient : female in child bearing period

I. Evidence of hypogonadism (↓ gonadotrophic hormones (FSH, LH); secondary hypogonadism ):

1. **In females:** History of labor with post partum hemorrhage followed by failure of lactation (due to ↓ prolactin) + amenorrhea , breast atrophy
2. **In males :** impotence
3. **In both sex:** loss of pubic & axillary hair & loss of libido, loss of fertility, atrophy of genitalia

II. Evidence of hypocorticism (↓ ACTH; secondary adrenal failure):

4. Loss of sun tanning power

⮰ مهما اتعرضت للشمس يفضل لونها زي ما هو ما تسمرش

5. Depigmentation of body especially areola (↓ MSH)

⮰ عكس المتوقع من واحدة لسه والدة

6. Hypotension is not severe due to continued release of Aldosterone

III. Evidence of hypothyroidism (↓ TSH; secondary myxedema) :

7. Symptoms of myxedema {but minimal weigh gain} : cold intolerance , …

❖ **N.B.**

A. **GH deficiency : not clinically detectable in adults; just:**

- Fine wrinkles & weakness
- ↑↑↑ sensitivity to insulin : hypoglycemia

B. **Due to cortisone treatment** : the patient is cushingoid → DM عكس المتوقع

C. **Diabetes insipidus** very late if posterior pituitary affected

- تقولك بشرب حوالي 15 لتر يومياً وبروح الحمام أنزل مياه كتير جداً وباخد علاج بخاخه Synthetic vasopressin puff

❖ **Diagnosis :** a cases of 2ry amenorrhea for DD most probably panhypopituitarism, (Sheehan's syndrome), She is under cortisone replacement therapy

❖ **Why Pituitary (Sheehan's) ?**

- Evidence of hypogonadism
- Evidence of hypocorticism
- Evidence of hypothyroidism

❖ **DD: myxedema :**

- N.B. : 3 differences between myxedema & Sheehan's:
- Etiology
- Manifestation: decrease gonadotropin (Gonadal affection), & decrease ACTH
- Treatment : cushingoid features

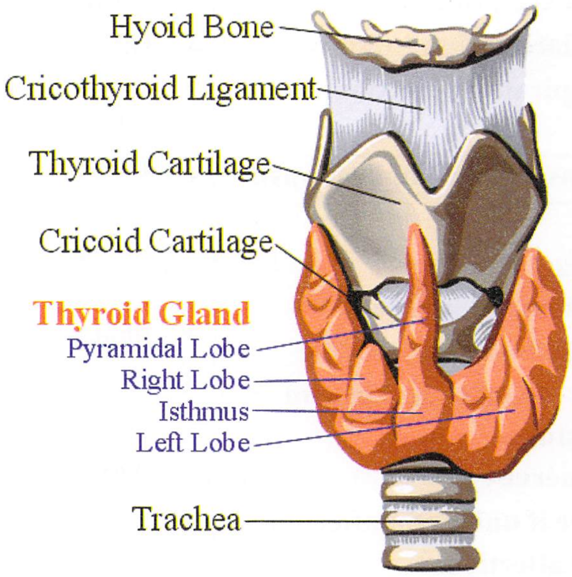
⮰ أهمية التفريق : لأنها لو اتشخصت myxedema هيدوها thyroxin ← Addisonian crisis

# GOITER

- **Normally :** thyroid gland is not felt , if enlarged → Goiter

❖ **Classification :**

1. **Simple goiter :**
   - Simple physiological goiter
   - Simple colloidal goiter
   - Simple nodular goiter (SNG)
2. **Toxic goiter:**
   - Primary or secondary toxic goiter
   - Toxic nodule
3. **Neoplastic :**
   - Benign neoplasm
   - Malignant thyroid
4. **Inflammation** as Hashimoto's thyroiditis
5. **Congenital** as Cretenoid goiter


Hyoid Bone
Cricothyroid Ligament
Thyroid Cartilage
Cricoid Cartilage
Thyroid Gland
Pyramidal Lobe
Right Lobe
Isthmus
Left Lobe
Trachea

# GOITER HISTORY

## A. Personal History

| | | |
|---|---|---|
| 1. **N**ame: الإسم ثلاثي | 2. **A**ge:<br>○ Toxic goiter:<br>- 1ry between 20 – 30 years<br>- 2ry between 30 – 50 years<br>○ Malignancy above 50 years<br>○ SNG at any age | 3. **S**ex :<br>○ Females : simple goiter<br>○ Males : malignancy |
| 4. **O**ccupation:<br>○ Exposure to radiation : malignancy | 5. **M**arriage: for infertility or impotence : toxic goiter<br>6. **M**enstrual history if female for disturbance | 7. **R**esidence & address: for endemic area as Fayoum or Wadi El-Natroun |
| 8. **H**abits of medical importance. | | 9. **H**andedness. |

## B. Complaint + duration: إي اللي جابك المستشفى ؟

❖ Common complaints :

| | | |
|---|---|---|
| ▪ Neck swelling | ▪ Symptoms of thyrotoxicosis (see later) | ▪ Symptoms of malignancy (see later) |

## C. History of present illness = HPI المرض بدأ معاك إزاي , آخر مرة كنت كويس فيها إمتى ؟

| | |
|---|---|
| 1. Analysis of the complaint : swelling ± pain | 2. Pressure symptoms (local complications) |
| 3. Systemic symptoms (general complications) | |
| 4. Investigations & treatment received | |

**I. Analysis of the complaint : swelling ± pain**

A. **Analysis :** OCD, site, number, associated other swelling as LNs metastasis

B. **Pain if present :**

- OCD, ↑, ↓, Associated symptoms
- Character, Site , Radiation
- Relation to (meal, respiration, exertion, postural)

**II. Pressure symptoms (local complications):**

1. **Trachea** → Dyspnea
2. **Esophagus** → Dysphagia but rare
3. **Sympathetic chain (Homer's syndrome)** = (Ptosis, myosis, enopthalmos, anhydrosis)
4. **Internal jugular vein** → Oedema of eye lid
5. **Carotid artery** → Postural fainting
6. **Recurrent laryngeal nerve :**
   → Hoarseness of voice if unilateral affection
   → Stridor if bilateral affection

**III. Systemic symptoms (general complications)**

**A. Toxic manifestations**

1. **Metabolic:**
   - ○ Loss of weight inspite of good appetite
   - ○ Intolerance to heat, Excessive sweating
2. **CVS:** Palpitation even at rest
3. **Chest:** dyspnea
4. **GIT:** polyphagia ± diarrhea
5. **CNS:**
   - ○ Tremors of tongue & hand , Irritability & insomnia
   - ○ Weakness of proximal limb muscle
6. **Urinary :** polyuria
7. **Skeletal :** generalized bone ache
8. **General :** diplopia of eye
9. **Gonadal :** impotence in male, menstrual disturbance in female

**B. Malignant manifestation :**

1. **Rapid** increase in size with **short** duration.
2. **Pain** is related to swelling or referred to ear
3. **Metastasis** to Lung, Brain, Liver, Bone
4. Symptoms of **infiltration** (see pressure symptoms)

**IV.** Investigations: Thyroid function tests, Radioactive iodine study, U/S, Biopsy

❖ Treatment : Medical, surgical, radiotherapy

## D. Past history :

- Similar condition, Diseases as DM, hypertension, heart disease etc.
- History of drug allergy or goiterogenic drugs as Thiouracil, neomercazole
- History of neck irradiation to exclude risk of malignancy.
- History of neck operation as thyroidectomy or L.N biopsy

## E. Family history

- Similar condition as in endemic goitre
- Cancer thyroid as medullary carcinoma, Congenital: Pendred's syndrome

## Discussion on history

| 1. What are the causes of painful goitre ? | 2. Why is dysphagia as pressure symptom being rare ? |
|---|---|
| • Malignancy , acute thyroiditis & hemorrhage in cyst | • Because oesophagus is a muscular tube. |
| 3. What are other causes of Horner's syndrome ? | 4. What are the causes of loss of weight inspite of good appetite ? |
| ○ Compression by goitre, pan-cost tumor & carotid aneurysm.<br>○ Complication after cervical sympathectomy.<br>○ Injury of lower part of brachial plexus. | • Toxic goiter,<br>• Uncontrolled D.M.,<br>• Parasitic infestation (hydatid cyst)<br>• Mal-absorption syndrome. |

5. **What are the causes of polyuria in case of toxic goitre ?**

| | | | |
|---|---|---|---|
| • Secondary DM → Glucosuria. | ↑ Metabolic rate | • ↑ Intake of water 2ry to polyphagia | • ↑ COP → ↑Renal blood flow→ ↑ GFR |

6. **Why is pain in malignancy of thyroid referred to Ear ?**

- Because of ear has same dermatomal supply i.e. Arnold nerve

7. **What are the types of biopsy done in case of goitre ?**

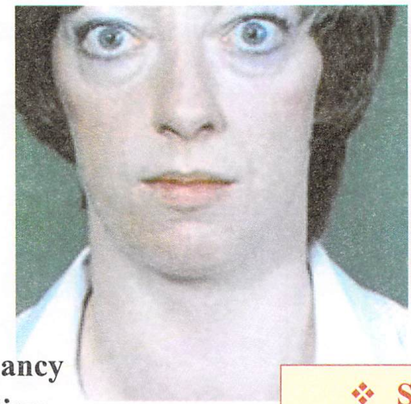
- FNAC, True cut biopsy & excisional biopsy.

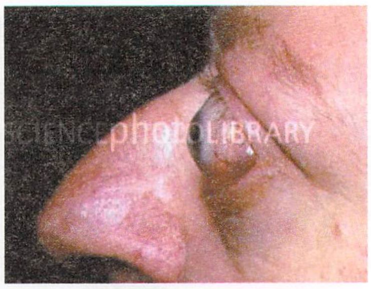
8. **What are symptoms of Pendred's syndrome ?** Goitre, dwarfism & deafness.

## I. General examination:

### A. Vital signs:

- Temperature : ↑ With toxic goitre.
- Pulse rate : with Toxic goiter
  - Tachycardia, regular or irregular , large volume, equal on both side & water hummer pulse as special characters
- Blood pressure : High systole & low diastole
- R.R may be increased





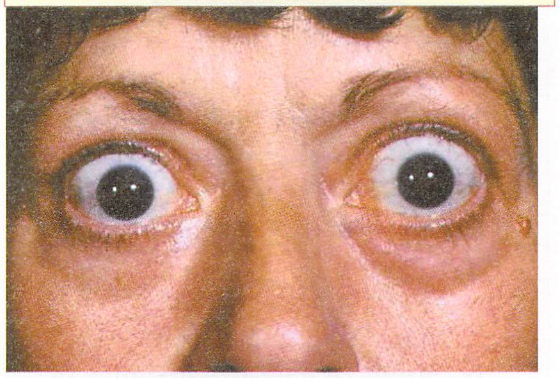
### B. General examination :

#### ❖ General overview:

- Appearance:
  - Ill with cachexia as in malignancy
  - Irritable & alert as in toxic goiter
- Built: under built as in hyperthyroidism or malignancy
- Conscious: conscious but apathy as in hypothyroidism
- Decubitus: orthopnea as in HF
- Facial Expression : starring look as in toxic goiter
- Intolerance to hot weather

**❖ Sites of tremors :**

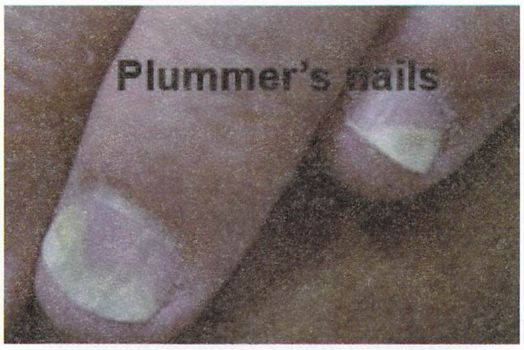
- Outstretched hand
- Slightly closed upper eye lid
- Protruded unsupported tongue



#### ❖ Systemic overview :

**1. Head:**

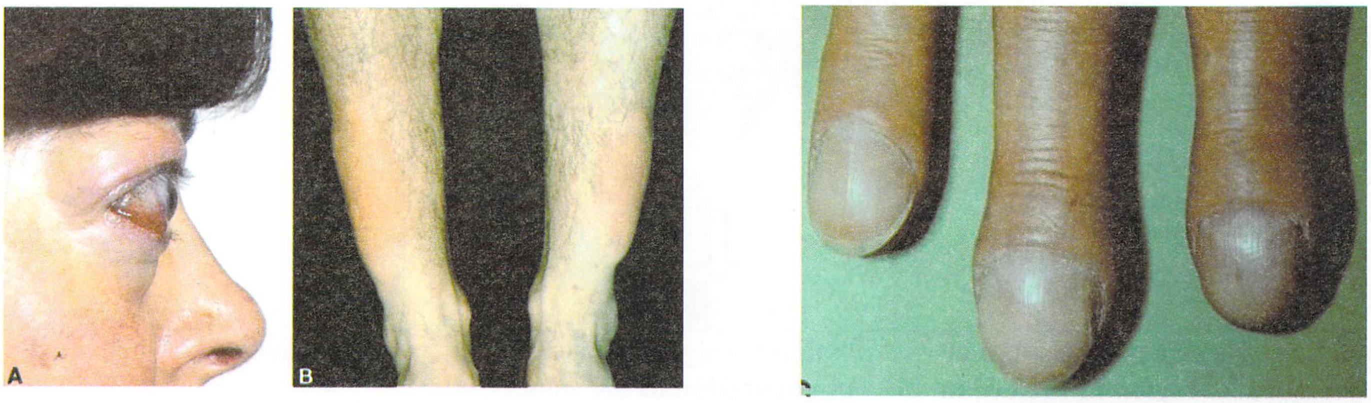
- Skull for swellings as (bone metastasis).
- Lip :
  - Pallor : thyroid dysfunction (hyper or hypo) or malignancy
  - Cyanosis : huge retro-sternal goiter
- Mouth for ectopic thyroid.
- Tongue for tremors. {N.B: Tongue must be unsupported}
- Eye for
  - Jaundice : anti-thyroid drugs or liver metastasis
  - Eye signs of thyrotoxicosis : see later
  - Exophthalmos: actual protrusion of eye ball, examination : see later



**2. Neck :** see local examination

**3. Upper limb :**

- Palmer erythema
- Plummer's nails: distal onycholysis
- Fine tremors of hand
- Warm, Moist, sweaty hands if Thyrotoxicosis. {N.B. If cold = psychoneurosis}



- **Thyroid acropachy:** in 1 % of patient with Graves : exophthalmos + pretibial myxedema+ clubbing

**4. Lower limbs :**

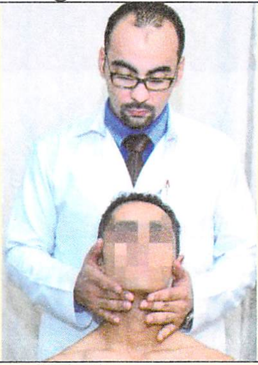
- Edema pitting if HF
- Pre-tibial myxedema
- Dorsalis pedis pulsation

5. **CVS:**
    - Sinus tachycardia (all types of arrhythmias except heart block)
    - High COP failure, Flow murmurs
6. **Chest:** metastasis to chest wall & mediastinal syndrome
7. **Abdomen :** liver & spleen enlargement
8. **CNS:**
    - Myopathy, Hyper-reflexia, Fine tremors ,nervousness & irritability
9. **Back :** for metastasis

## ☠ How to examine exophthalmos :

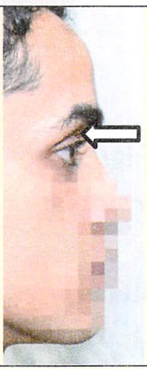
### I. To show true or false:

**A. Naffziger test :**



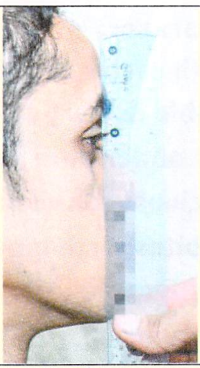
- ○ واقف خلف المريض
- ○ واثني راسه للخلف بدرجة بسيطة
- ○ Observe the eye ball from above keeping the supraciliary ridges as your plane of vision
- ○ In true exophthalmos : eye is seen protruding

**B. Frazer's test :**



- ○ واقف بجانب المريض
- ○ To see of sulcus of orbital margin & covered globe with the patient's eye slight closed.
- ○ In true exophthalmos the sulcus is shallower than normal

**C. Ruler test**



- ○ واقف بجانب المريض
- ○ A ruler is put to touch the superior & inferior orbital margin
- ○ In true exophthalmos the cornea is touched

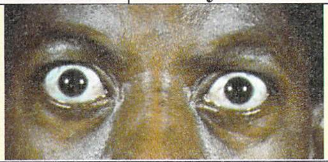
### II. To determine the degree :

A. Exophthalmometer

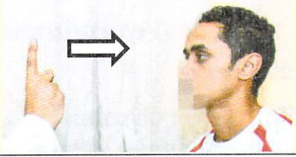
B. Ruler to measure distance between lateral orbital margin & apex of cornea (Normally = 15-17m)

## ☠ How to examine eye signs :

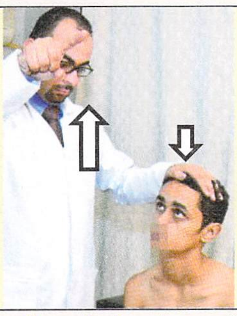
- ○ **Stellwag's sign :** infrequent blinking (Normally = 5-8 times/min)
- ○ **Dalrymple's sign:** A rim of sclera between cornea & upper eye lid



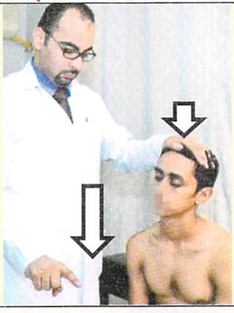
- ○ **Mobius sign :** Lack of convergence on looking to near object due to weakness of Medial recti muscle



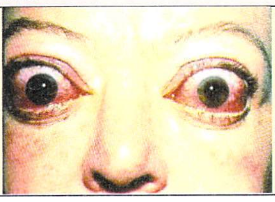
- ○ **Joffroy's sign :** Loss of wrinkling of the forehead when moving the eye upwards with head fixed



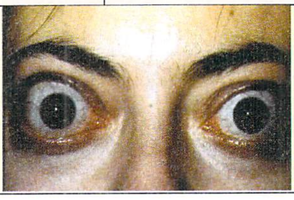
- ○ **Von Graefe's sign :** Upper eye lid lags behind when moving the eye downwards with head fixed ( Grave المقابر وكده تحت )



- ○ **Rosenbach's sign :** Tremors in upper eye lid when eyes are gently closed
- ○ **Topolansky's sign:** Congestion of to pericorneal region of the eye in patients



- ○ **Jellinek's sign:** brownish pigmentation of the upper eyelid
- ○ **Tellas's sign :** brownish pigmentation of the lower eyelid



## Discussion on General examination

1. What is meant by sleeping pulse ?
    - It is clinical confirmation of rapid pulse even during sleep so it excludes anxiety
2. Why are vital signs stable in case of toxicity during examination ?
    - Because, the patient under treatment e.g. Indral
3. What is the cause of unequal pulse in case of goitre ?
    - If Retro-sternal extension (R.S.E)
4. What are other causes of water hummer pulse ? see general chapter
5. How can you diagnose under built ?
    - Prominent maxilla & zygoma
    - ↓ Muscle bulk.
    - ↑ Fold of skin at biceps & triceps muscles.
6. Which type of malignancy characterized by bone metastasis ?

- Follicular carcinoma

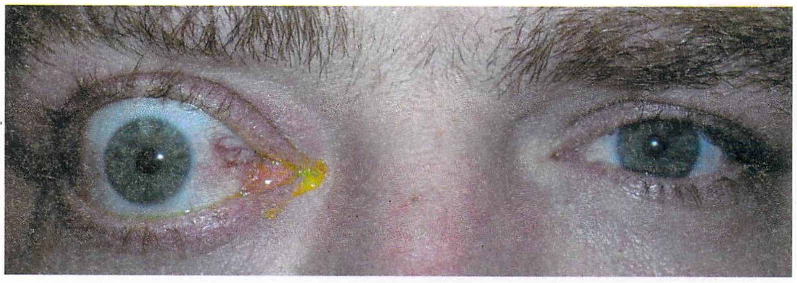
7. What is meant by exophthalmos ?

- Actual protrusion of eye ball.

8. What is the cause of exophthalmos ?

Unknown but may be E.P.S. (Exophthalmos producing substance)

9. What are the causes of unilateral exophthalmos ?



- Orbital cellulites.
- Orbital neoplasm.
- Cavernous sinus thrombosis.
- Orbital aneurysm i.e. ophthalmic artery aneurysm
- A-V fistula between ICA & cavernous sinus
- Neurofibromatosis of optic nerve.

10. What are the causes of pulsating exophthalmos ?

- Orbital aneurysm & A-V fistula between I.C.A & cavernous sinus

11. What is the difference between true & apparent?

- True exophthalmos = rim of sclera above & below the cornea
- False exophthalmos = rim of sclera above the cornea (Upper eye lid retraction)

12. What is DD between fine & flapping tremors ?

- Fine tremors : Due to ↑ metabolites → irritation of nerve ending → tremors of small joints of hand.
- Flapping tremors: Due to ↑Toxins → irritation of extra-pyramidal Δ → tremors of wrist joint of hand

13. What is meant by pre-tibial myxedema ?

- Pretibial myxoedema presents with a swollen and lumpy appearance over the shins and sometimes also affects the feet. The skin may be discolored pink or purple, with prominent hair follicles.
  This is known as 'peau d'orange' (orange-peel) appearance. It may instead look warty or 'verrucous'.
- It is due to deposition of mucin at skin.
- Associated with clubbing fingers& toes

14. What is meant by mediastinal syndrome ?

- Dyspnea , congested neck veins , brassy cough

15. What are the causes of liver enlargement ?

- Thyrotoxic HF.
- Auto-immune [1ry toxic goitre & Hashimoto's thyroiditis]
- Thyroid lymphoma.
- Liver metastasis.

16. What are causes of spleen enlargement ?

- Auto-immune [1ry toxic goitre & Hashimoto's thyroiditis]
- Thyroid lymphoma

## II. Local examination:

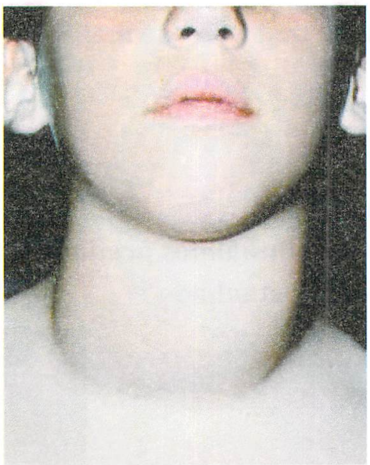
- **Proper position :** patient is sitting down & neck is extended :
  - N.B.: **Pizzillo's method** : it patient obese with short neck, ask him to put his hand behind his neck
- **Proper exposure :** whole head & neck up to supra-clavicular fossa ( from the nipple upwards)

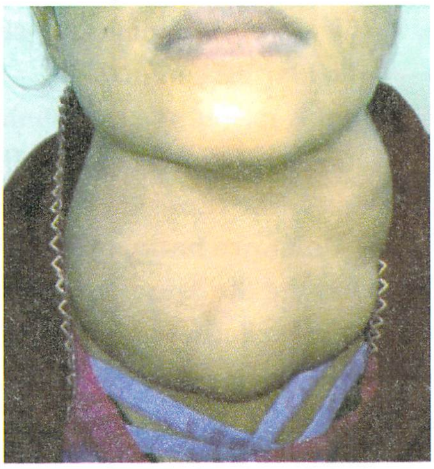
### I. Inspection (N, 6S, E, 3D): patient is sitting with extended neck from 2 sites: front & side :

كلمة السر : ابلع ريقك

1. **Number :** Single swelling
2. **6 S**

- **Site :** Lower part of front of neck i.e. muscular triangle
- **Shape :**
  - If diffuse (U shaped or butterfly)
  - If localized (irregular or oval)
- **Size :** Variable in (cm x cm)





- **Surface :**
  - Smooth if 1ry toxic goitre.
  - Nodular if: 2ry toxic goiter or SNG.
  - Irregular if malignancy
- **Skin over :**
  - Dilated veins if retro-sternal goitre.
  - Scars if previous thyroidectomy or Biopsy
  - Redness if inflammation.
  - Infiltration if malignancy
- **Special signs**

A. **Pulsation** :look tangentially : may be
  - Expansile at the upper pole as in 1ry toxic goitre.
  - Transmitted if over carotid artery.

B. **Move up & down** with deglutition as goiter

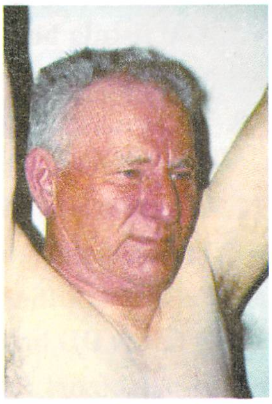
3. **Lower Edge :** (Better seen with deglutition) well defined or not.

- We comment on lower pole seen or not to exclude retro-sternal extension : ill-defined edge

4. **Deep structure:** ask the patient to flex the neck against resistance then look to the size:

- If smaller → Deep to muscle
- If same size→ Infiltrate the muscle i.e. malignancy.

5. **Draining L.Ns "For metastasis"** see chapter lymphadenopathy
6. **Distal Effect:**



- Pemberton's sign in R.S. Extension: Ask patient to raise up arms & keep this position for a while → congestion of face due to obstruction of great veins & trachea at thoracic inlet

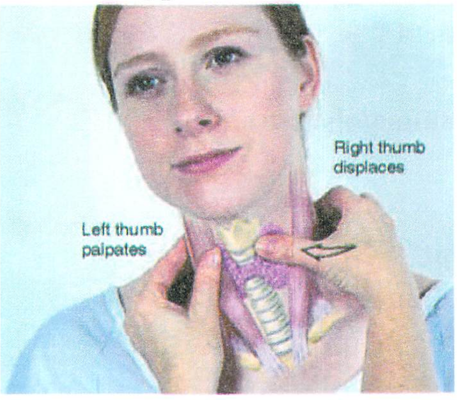
### II. Palpation :

#### A. Palpation from front:

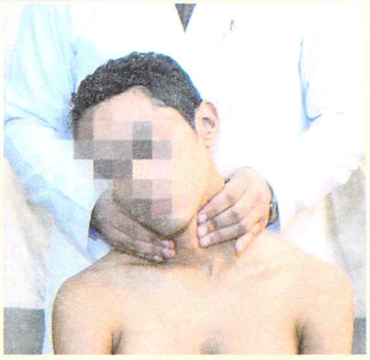
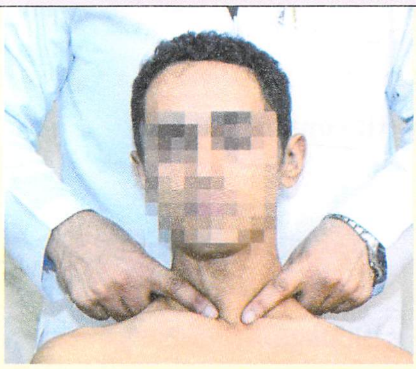
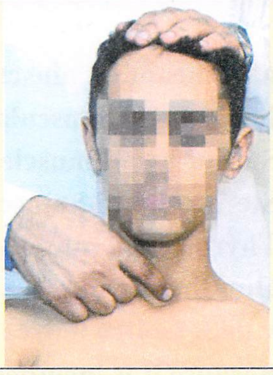
1. Lahey's method:

- Push thyroid gland to one side and palpating the lobe of that side with the other hand and then repeat for other lobe

2. Crile's method: for small gland with the thumb, placed over the lobe while the patient is swallowing



**B. Palpation of thyroid gland from behind:** Classic method

| ✍ Examination of thyroid lobes: | ✍ Examination of lower border | ✍ Examination of the isthmus : |
|---|---|---|
|  |  |  |
| • Palpation of thyroid gland from behind with flexed neck & slightly tilt the head laterally to the side examined to relax the deep fascia of the neck (investing layer)<br>• Put your thumbs upon the nape & put other fingers over the gland<br>• Press by one hand over one lobe and feel the other lobe by other hand | ○ By radial sides of indices & ask the patient to swallow | • Stand behind the patient<br>• Put one of your hands on the head of the patient<br>• Tilt the head of the patient forward<br>• Put the index of the other hand on the midline of the trachea and palpate<br>• Ask the patient to swallow |

❖ Then comment on the following :

1. **3T:**
- **Temperature حركة بظهر اليد:** warm as in toxic goiter
- **Tenderness حركة ببطن اليد وعيني على وش العيان:** tender as in malignancy
- **Thrill :** at upper part as in toxic goiter
2. **6S:**
- **Site, Shape, Size, Surface حركة براحة اليد [ then comment as inspection ]**
- **Skin over:** (attached to skin or not) by :
  - Pinching skin from swelling.
  - Sliding the skin over the swelling.
  - Push swelling under skin: If puckering = infiltrated skin. i.e. malignancy
- **Special sign [ as inspection ]**
3. **Lower border (Edge) حركة بجنب اليد:** Well defined or ill defined
4. **Consistency حركة باليدين:** may be :
- Hard as in malignancy or calcified SNG
- Firm as in 2ry toxic goitre or SNG.
- Soft in 1ry toxic goitre or physiological goiter
5. **Deep structure :**

A. **Muscle: Sternomastoid:** tilt the head to the same side and try to pinch the muscle and ask the patient to swallow
- If you pinch the muscle freely and not moved with swallowing → not fixed

B. **Carotid vessels : common carotid pulsation:** May be:
- Displaced carotid pulsation as in benign lesions
- Absent carotid pulsation (i.e. **Berry's sign**) as in malignancy.

C. **Trachea :**
- **Position:** central or not.
- **Mobility (attached or not to the swelling) :** grasp whole swelling to show mobility in side to side on trachea (Rocking) then up & down

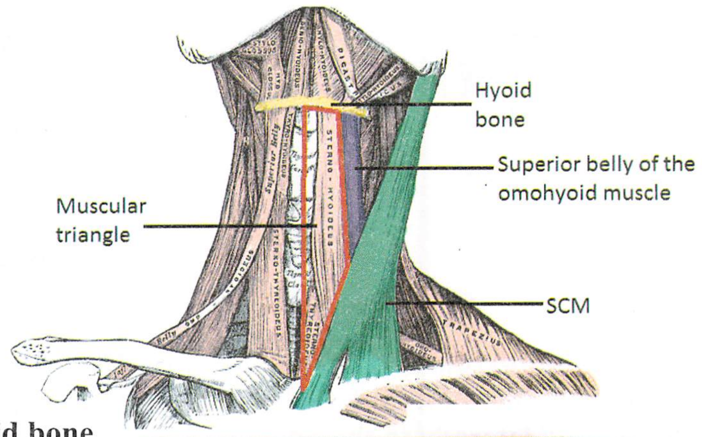
6. **Draining L.Ns** upper & lower deep cervical L.Ns (See chapter lymphadenopathy)
7. **Distal effect: Kocher's test:**
- Slight compression on lateral lobes produce stridor → It means tracheomalacia

**III. Percussion :** Direct percussion on manubrium sterni is normally resonant, If dull = Retro-sternal goiter

IV. **Auscultation :** A Systolic Murmur may be heard over upper pole i.e. Thyroid bruit as in $1^{ry}$ toxic goiter

# Discussion on local examination

1. **What is meant by muscular triangle ?**
   - It is called " muscular Δ " because it contains:
     - Sterno-hyoid muscle.
     - Sterno-thyroid muscle.
     - Thyro-hyoid muscle.
     - Omo-hyoid muscle



2. **Why does Goitre moves up & down with deglutition ?**
   - Because it is included in pre-tracheal fascia.

   ❀ *NB.: Attachment of pre-tracheal fascia:*
   - Above : Oblique line of thyroid cartilage & hyoid bone
   - Below: Superior mediastinum,
   - On each side : carotid sheath

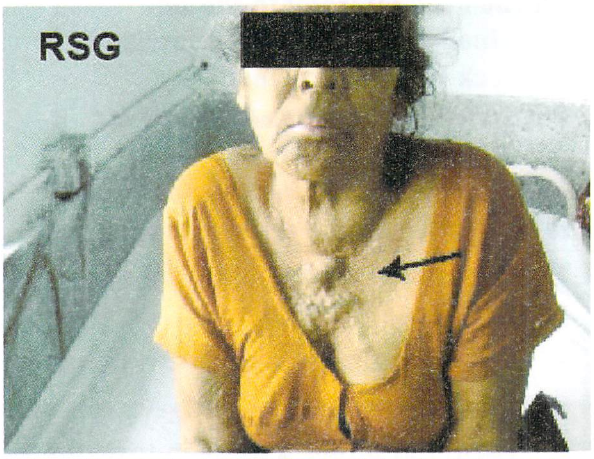


Fig. 1 : Photograph of anterior chest wall showing tortuous veins and neck showing goitre.

3. **When is Goitre unable to moves up & down with deglutition ?**
   - Malignancy
   - Retrosternal extension (R.S.E.)
   - Huge in size.
   - Riedel's thyroiditis (due to fibrosis)
4. **Which Swellings moves up with protrusion of tongue ?**
   - Thyroglossal cyst.
   - Sub-hyoid bursitis.
5. **What are other Swellings move up & down with deglutition?**
   - Goitre.
   - Thyroglossal cyst.
   - Pre-tracheal L.Ns
   - Pre-laryngeal L.Ns.
   - Sub-hyoid bursa.
   - Laryngocele.

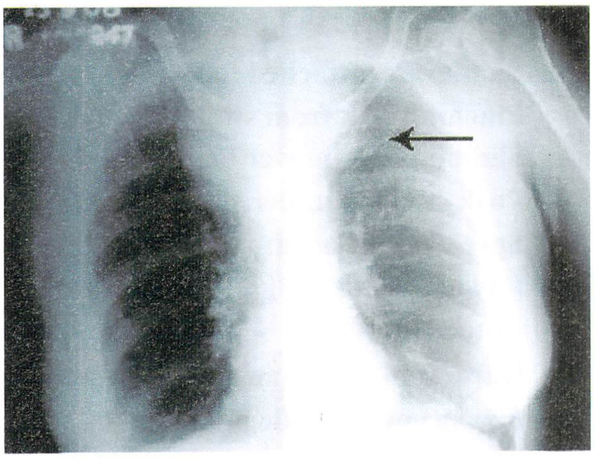
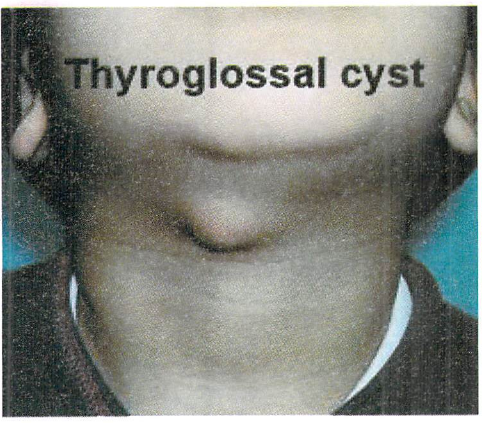
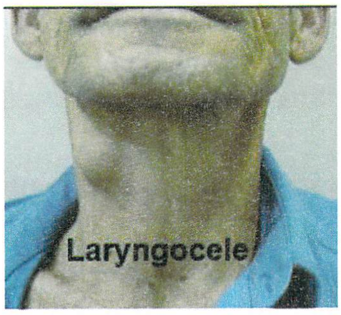


Fig. 2 : Chest x-ray PA view showing retrosternal goitre.

6. **What are the causes of Hard goitre ?**
   - Malignancy.
   - Riedel's thyroiditis.
   - Calcified SNG.
   - Tense cyst
7. **What is the Anatomical site of Carotid artery ?**
   - It felt Against carotid tubercle of C6.
8. **What is the 1st L.Ns felt Clinically in Malignancy ?**
   - Pre-laryngeal L.Ns
9. **What is the value of Kocher's test?**
   - The value is preoperative consent (from patient) for tracheostomy



10. **What are the causes of dullness on Manibrium sterni ?**
    - Retrosternal goitre.
    - Ectopic thyroid tissue.
    - Pre-tracheal L.Ns.



11. **What are the complications of SNG ?**
    - Carcinoma "follicular type 3%"
    - 2ry toxic goitre.
    - Hemorrhage on cyst.
    - Calcification.
    - Retrosternal extension

# DIAGNOSIS

- **During examination : We suspect the following clinical cases**
  1. Toxic goitre (1ry or 2ry )
  2. Malignancy.
  3. Simple nodular goitre (SNG)
- **So for diagnosis we must to exclude**
  1. **Manifestation of toxicity:** For D.D between 1ry and 2ry :

| 1ry: | 2ry: |
|---|---|
| Grave's (Basedow's) disease | Plummer's disease |
| ○ Symmetrical<br>○ Soft & Smooth<br>○ Young (20 - 40 years)<br>○ The mass at same time of toxicity<br>○ Eye signs. | ○ Asymmetrical<br>○ Firm & nodular.<br>○ Middle (40-50years)<br>○ The mass before time of toxicity<br>○ No eye signs (extreme rare) |

2. **Manifestation of malignancy**

- Swelling is THIEF (Tender, Hard, Irregular, Enlarged & Fixed )
- Berry's sign (Absent carotid pulsation)
- L.Ns (Enlarged, hard, 1st mobile then fixed)

3. **By Exclusion of 1 & 2: The case is SNG**

# Acromegaly

- **Personal history ….**
- **Complaint:** Headache, vomiting of 8 years duration.
- **HPI:**
  - The condition started 8 years ago by gradual onset, progressive course of **headache,** bursting in character, increased in the morning associated with **blurring of vision**. The patient also noticed rapid increase in the sizes of his shoes and rings.
  - 3 years later, the patient developed **polyphagia, polyuria, polydypsia** investigated by random blood sugar, diagnosed as **diabetes mellitus**, treated by glucophage. Few months later, the patient developed **generalized bony pain, joint pain and tingling and numbness in both hands and feet.**
  - The patient sought medical advice and investigated by skull x-ray and CT, diagnosed as pituitary adenoma and treated by surgery.
  - No symptoms suggesting pulmonary or systemic congestion.
- **Past history:** No drugs, operation
- **Family history :** No consanguinity, No similar condition in family, No common disease in family.
- **General examination :**

**A. Vital signs:**
- **Temperature:** 37° c.
- **Bl. Pressure:** 160/90.
- **Pulse:** Regular, 70 beat/minute, average volume, no special character, equal in both sides, intact peripheral pulsation, vessel wall is not felt.

**B. Mentality:** The patient is fully conscious, well oriented for time, place and person. Average mood and memory. The patient is co-operative with average intelligence.

**C. Built:** may be tall stature (specially in gigantism).

**D. Head:**
- Elongated head, Prominent supra-orbital ridges, Enlarged nose, lip, ear, prognathism, separated teeth.
- Skin folds in back of the neck, Husky voice, Defect in visual acuity, field.

**E. Neck :**

**By inspection:**
- Swelling In front of lower neck, butterfly appearance, move up and down with deglutition, disappear on contraction of sternomastoid muscle with no dilated veins or scar.

**By palpation :**
- Thyroid swelling is firm, homogenous, lower border is reached with deglutition, not attached to sternomastoid muscle, with central trachea, intact carotid pulsation, with no thrill or tenderness.

**By percussion:** resonant manubrium sterni.

**By auscultation :** no bruit.

**F. Extremities:**
- UL: spade like (Acromegallic hand), LL: large leg (Acromegallic leg).

**G. Skin:** Thickened, folds, sweaty, greasy skin.

- **Systemic examination :**
  - **Neuromuscular:** search for myopathyand neuropathy (see Neurology).
  - **Bone:** Crepitus in knee joint.
  - **Heart:** No signs of hypertension (cardio), No apical gallop, pulsus alternans, basal crepitation (LVF). No signs of systemic congestion (RVF).
- **Investigations: X-ray skull, heel, hand, joint, CT , MRI, GH level, Blood sugar**
- **Treatment**
  - Somatotatin analogue: Octreotide, GH antagonist: pigvisomant, Surgical removal of adenoma.
- **Diagnosis :**
  - Case of acromegaly for D.D most probably due to pituitary adenoma
    - Adenoma → ↑ I.C.T
    - Acromegaly → hand, head, effects of growth hormone on skin ,joint .DM,...

## Cushingoid Disease

- **Personal history ….**
- **Complaint**: Progressive weight gain of 3 years duration..
- **HPI:**
  - The condition started 9 years ago by **skin rash** at face, **loss of hair**, **dyspnea**, **odema of L.Ls** then the patient sought medical advice and investigated and diagnosed as a systemic lupus erythematosis and treated by cortisone.
  - 3 years later, she experienced **headache**, **blurred vision**, **tinnitus** associated with **polyphagia, polyuria, polydypsia**. The patient sought medical advice and investigated, then diagnosed as HTN, DM and took medical ttt in the form of capozide, glucophage .
  - The patient complained of gradual onset, progressive course of **increased body weight** in last 3 years.
  - The patient also gives history of **generalized bony pain** and **difficulty in lifting heavy** objects and **tingling and numbness** in both hands and feet also increased in the last 3 years of her story.
  - No symptoms suggesting cardiovascular system affection, No menstrual troubles
  - No symptoms suggesting pulmonary T.B , No history of abdominal swellings
- **Past history:** No drugs, operation
- **Family history :**
  - No consanguinity, No similar condition in family, No common disease in family.
- **General examination :**

A. **Vital signs:**
  - **Temperature:** 37° c.
  - **Bl. Pressure:** 160/90 (with TTT)
  - **Pulse:** Regular, 70 beat/minute, average volume, no special character, equal in both sides, intact peripheral pulsation, vessel wall is not felt.

B. **Mentality:** The patient is fully conscious, well oriented for time, place and person. Average mood and memory. The patient is co-operative with average intelligence.

C. **Built**: central obesity

D. **Head:**
  - Moon face, acne vulgaris, plethoric face, hirsutism, loose teeth, decrease acuity of vision

E. **Neck : buffalo hump, supra-clavicular pads of fat**

F. **Skin:** thin, stria rubra, no pigmentation, no diabetic skin changes, no purpura

- **Systemic examination :**
  - **Cardio:** search for signs of HTN and HF (cardiology)
  - **Bone:** there is generalized bony tenderness and crepitus with joint movements.
  - **Neuromuscular:** search for myopathy, neuropathy (Neurology).
  - **Chest :** search for T.B (chest)
  - **Abdomen:** no mass in renal angle (adrenal), No masses in abdomen by inspection, palpation (ovarian masses, paramalignant).
- **Investigations:**
  - CBC: ↑ RBCs, ↓ eosinophil, lymphocyte
  - Blood level of : ↑ Na, ↓ k, ↑ Bl. Glucose.
  - Level of cortisol at morning (8 am) at night (11pm).
  - Level of 17-Hydroxycorticosteroids (OH CS) in urine, free cortisol.
  - Overnight dexamethasone suppression test.
  - U.S, x-ray abdomen.
  - CT, x-ray, MRI skull.
- **Treatment**
  - Stop exogenous cortisol gradually or try to moderate the dose to the lowest effective dose.
- **Diagnosis : A case of obesity + HTN+ DM for D.D most probably Cushingoid disease**

# Addison's Disease

- **Personal history ….**
- **Complaint**: Change of the color of skin and tongue 20 years duration.
- **HPI:**
  - The condition started 30 years ago by **night fever, night sweat, loss of appetite and loss of weight.** Few days later, the patient got an attack of **hemoptysis**, blood was bright red in colour, containing froth, then the patient saught medical advice and investigated by chest x-ray, CBC, and diagnosed as **pulmonary T.B** and took ttt in the form of streptomycin, INH, rifampicin and advised to follow this TTT for one year but the patient discontinued the treatment .
  - 10 years later the patient developed excessive **pigmentation** in hands, face, neck, axillae, tongue and gums associated with marked **fatigue**, **weight loss**, **vomiting**, **polyuria**, **diarrhea** and **back pain**. The patient was admitted to hospitals and treated many times with IV fluids and vitamins.
  - In the last 5 years, the patient complained of **unsteadiness on sudden standing** with **headache**, **abdominal pain** the patient was admitted to hospital and investigated and took replacement therapy in the form of glucocorticoids and mineralocorticoids .
- **Past history:** No drugs, operation, diseases (HTN, DM)
- **Family history :**
  - No consanguinity, No similar condition in family, No common disease in family.
- **General examination :**
- **Vital signs:**
  - **Temperature:** 37° c. → improved.
  - **Bl. Pressure:** 100/70 (Recombinant position), 60/40 (Standing position). → now improved.
  - **Pulse:** Regular, 70 beat/minute, average volume, no special character, equal in both sides, intact peripheral pulsation, vessel wall is not felt, no radio-femoral delay.
- **Built:** Average built (now improved → was under built).
- **Mentality:** The patient is fully conscious, well oriented for time, place and person. Average mood and memory. The patient is co-operative with average intelligence
- **Color:** there is tanning in face, neck, dorsum of hands, palmar crease, elbow, knee, umbilicus, areola, knuckles, in axillae and in between thighs. There is also slate like pigmentation in m.m of inner lip, buccal mucosa, palate, gum, tongue,
- **Systemic examination :** There is tenderness in the renal angle.
- **Investigations:**

  **A. Blood sample:**
  - ↓ cortisol
  - ↓ Na, ↑ k
  - ↓ blood glucose
  - Anemia, lymphocytosis, eosinophilia

  **B. Urine sample:**
  - ↓ cortisol, 17 OHCs, 17 KCs
  - ↑ Na, ↓ k
  - ↑ volume.

  **C. X-ray, CT abdomen, chest.**

- **Treatment:** Replacement therapy: Corticosteroid & Mineralocorticoid.
- **Diagnosis : A case of hyperpigmentation most probably Addison's under replacement therapy most probably due to T.B in adrenal glands**
- **Why addison's?** (to be differentiated from renal failure which give the same picture but with no pigmentation in MM and no hypotension)
  - **Pigmentation in mm.**
  - **Postural hypotension. (Bl. Pr. not exceed 110)**

# Myxedema

- **Personal history ….**
- **Complaint**: Puffiness of upper eye lids of 7 years duration.
- **HPI:**
  - The condition started 7 years duration by gradual onset, progressive course of **puffiness** of upper eyelid followed by **generalized body swelling** and diagnosed as nephrotic disease and take medication in the form of corticosteroid.
  - One year later, the patient experienced **marked weight gain despite loss of appetite, cold intolerance**, marked **fatigue**, and sever **constipation** relieved only by enema. Few years later the patient suffered from **tingling and numbness** in both hands and feet, **difficulty in lifting heavy objects**, and the patient become **apathetic, dull**. The patient also suffered from **headache and blurring of vision** and was discovered as hypertensive patient and also noticed **abnormal increase in menstrual blood** and **marked irregularity** in previously normal cycles.
  - The patient sought medical advice and investigated by thyroid function tests and diagnosed as myxedema and treated by thyroxin.
  - 3 years after TTT, the patient developed **retrosternal chest pain** radiated to the left shoulder, increased with exercise, investigated by ECG and ECHO and diagnosed as ischemic heart disease and treated by nitrates. This was followed by **polyphagia, polydipsia** investigated by random blood sugar and diagnosed as diabetes mellitus .
- **Past history:** No drugs, operation
- **Family history :**
  - No consanguinity, No similar condition in family, No common disease in family.
- **General examination :**
- **Vital signs:**
  - **Temperature:** 35° c.(now improved)
  - **Bl. Pressure:** 160/90.
  - **Pulse:** Regular, 60 beat/minute, average volume, no special character, equal in both side, intact peripheral pulsation, vessel wall is not felt. (was bradycardia)
  - Cold intolerance.
- **Built:** Over-weight.
- **Color:** Malar Flush, pallor, carotinemia (may be)
- **Mentality:** The patient is fully conscious, well oriented for time, place and person. Average mood and memory. The patient is co-operative with average intelligence.
- **Head:**
  - Puffy face.
  - Dry brittle hair then Alopecia.
  - Loss of outer % of eye brows, periorbital swelling.
  - Husky voice.
  - Malar flush., No macroglossia.
- **Neck :** No scar, no dilated veins, no thyroid swelling.
- **Skin:** Cold, pale, thick, edematous.
- **Extremities:** UL & LL: non pitting edema.
- **Systemic examination :**
  - **Muscle:** myopathy, neuropathy → notice delayed relaxation of tendon jerks (see Neuro)
  - **Cardio:** search for HTN, IHD, pericardial effusion (cardio)
  - **Chest: search** for pleural effusion.
  - **Abdomen** : abdominal distension
- **Investigations: Thyroid function tests.**
- **Treatment Replacement by eltroxin gradually to avoid coronary heart disease.**
- **Diagnosis : A case of myxedema most probably auto immune.**
- **Why myxedema??**
  - Deposition of myxedematous substance. Exclude iatrogenic cause.
- **Why autoimmune?**
  - Exclusion of iatrogenic causes, associated DM.

# Thyrotoxicosis

- **Personal history ….**
- **Complaint**: swelling in the neck 5 years duration.
- **HPI:**
- The condition started of 5 years ago by **swelling** in front of lower neck of gradual onset, progressive course .Then the patient experienced **palpitation**, **decrease in body weight** in spite of excellent appetite, **irritability**, **insomnia**, **heat intolerance.** Then the patient sought medical advice, admitted to hospital and investigated by ECG, urine, stool analysis, blood sugar.
- The patient alse gives no history of **diarrhea**.
- No dyspnea, dysphagia or change of voice, no pain in neck .
- No symptoms suggesting cardiovascular system affection.
- No symptoms of muscle diseases.
- **Past history:** No drugs, operation
- **Family history :**
  - No consanguinity, No similar condition in family, No common disease in family.
- **General examination :**

- **Temperature:** 37° (normal)
- **Bl. Pressure:** 160/80.
- **Pulse:** Regular(may be irregular), 110 beat/minute, big pulse volume, equal in both sides, with water hammer pulse, intact peripheral pulsation, vessel wall is not felt, no radio-femoral delay.
- Heat intolerance.
- **Built:** Average( may be under built)

→ **Head:_:** the patient has certain eye signs:

- Infrequent blinking "Stellwag's sign".
- Rim of sclera between cornea, eye lid "Dalrymple sign".
- Loss of corrugation on upward movement "Joffroy's sign".
- Lid lag "Von graffe's sign".
- Lack of sustained convergence "Mobius sign".
- Exophthalmos confirmed by Naffziger method, ruler method, Frazer's method.

→ **Neck :**

**By inspection:**

- Swelling in front of lower neck, butterfly appearance, move up and down with deglutition, disappear on contraction of sternomastoid muscle with no dilated veins or scar

**By palpation :**

- Swelling is firm, homogenous, lower border reached during deglutition, not attached to sternomastoid muscle, with central trachea, intact carotid pulsation, with thrill, no tenderness.

**By percussion:** resonant manubrium sterni

**By auscultation :** bruit near upper pole of the swelling.

→ **Extremities:**

- UL: fine tremors in out stretched hands, warm, sweaty.
- LL: non pitting edema, hyperreflexia (may be pitting oedema if complicated by HF).

→ **Skin:** warm, moist, sweaty, acropachy, pretibial myxedema.

- **Systemic examination :**
  - **CVS:** search for HF, and hemic murmurs.
  - **Neuro:** Exaggerated deep reflexes, tremors
- **Investigations:** **Thyroid function tests.**
- **Diagnosis :** **A case of mass in muscular triangle most probably thyroid swelling; hyperthyroidism for D.D most probably graves' disease.**

# References

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ℜ Hutchison's Clinical Methods, 22nd Edition.

ℜ Chamberlain Symptoms And Signs In Clinical Medicine, 11th Edition.

ℜ Problem-Oriented Medical Diagnosis (Lippincott Manual Series).

ℜ Barbara Bates, A Guide To Physical Examination And History Taking, 6th Edition.

ℜ Sapira's Art And Science Of Bedside Medical Diagnosis, 4th Edition.

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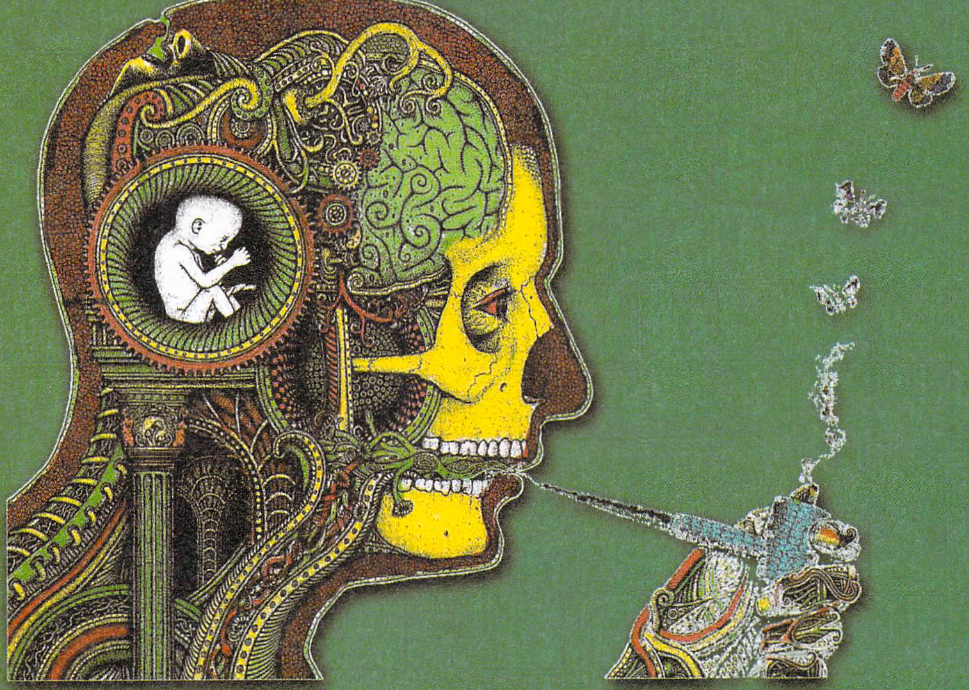

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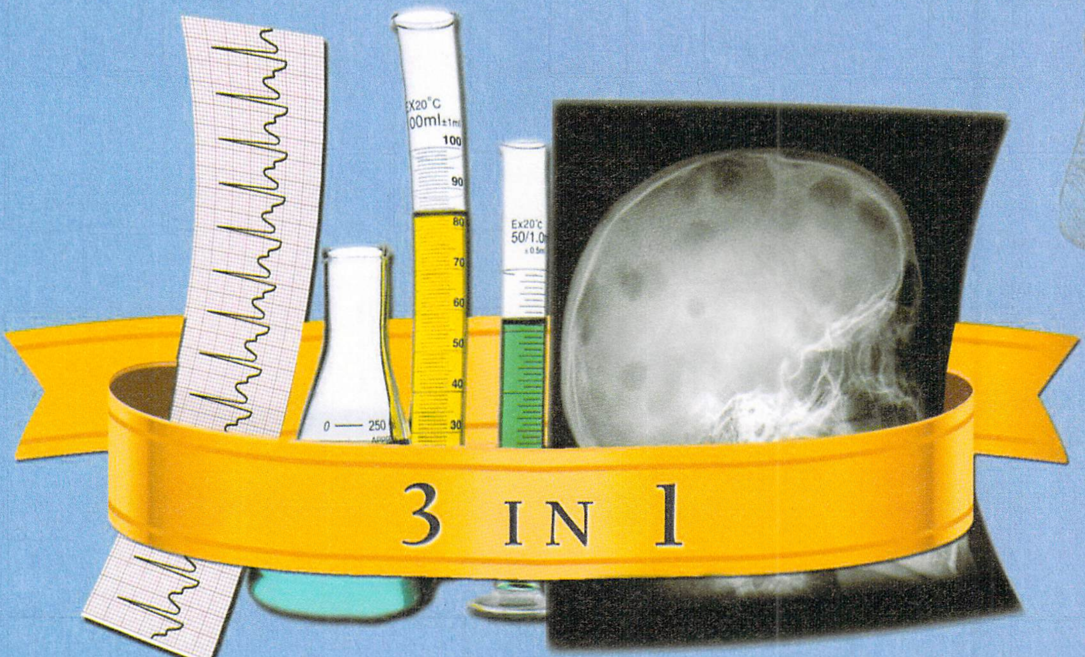

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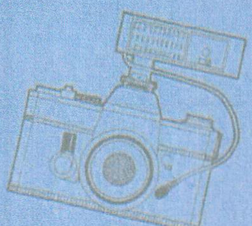

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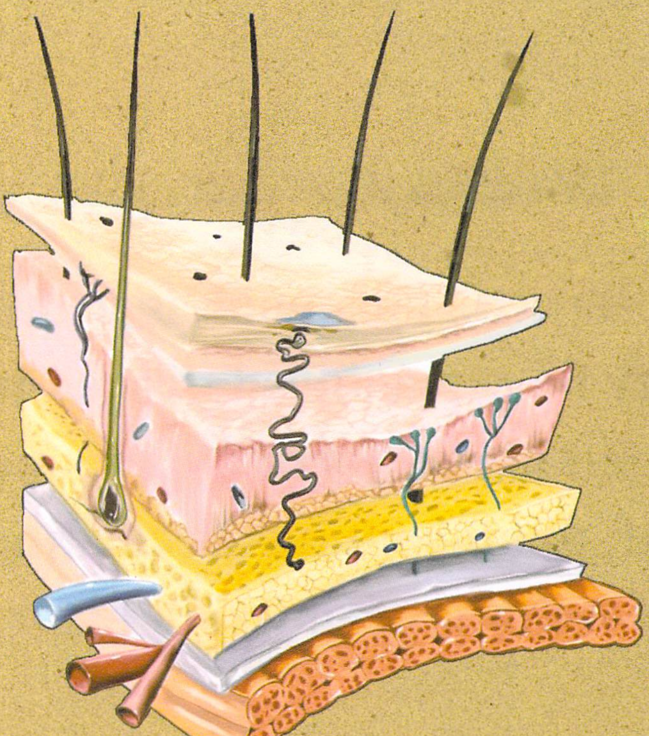

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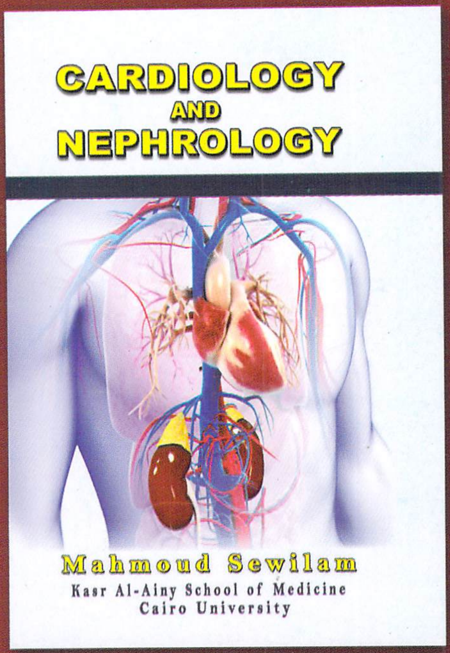
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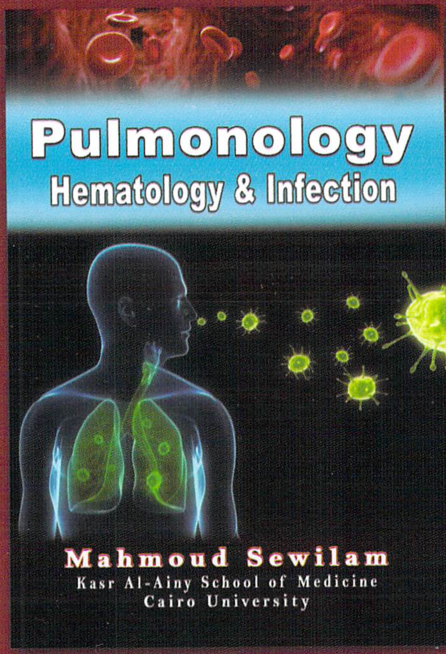
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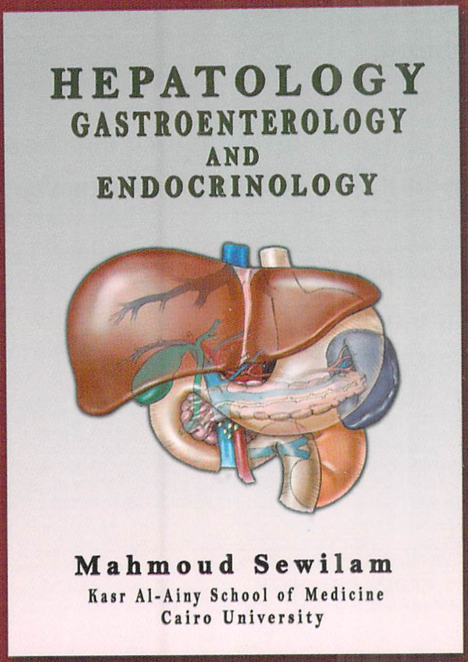
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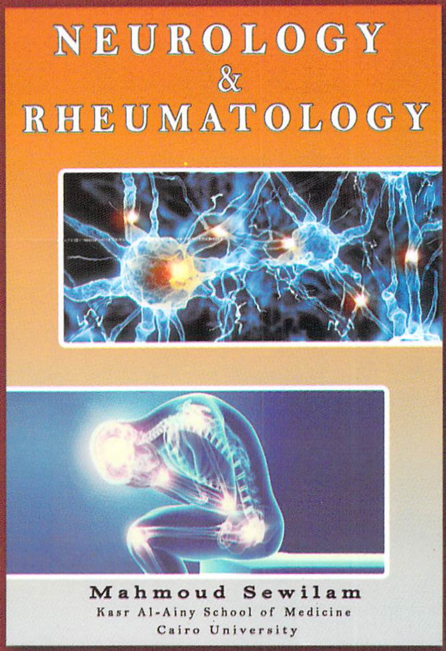
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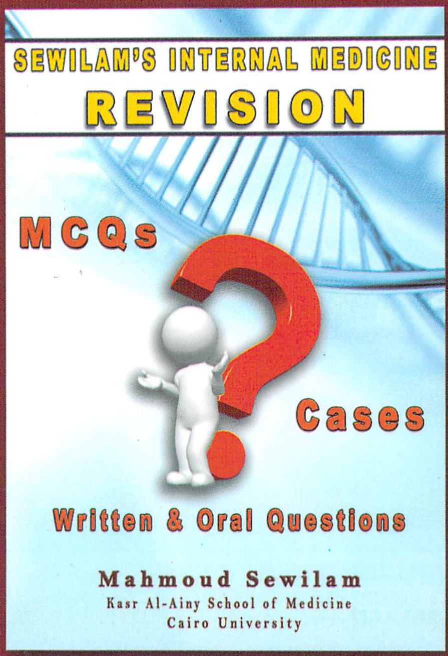
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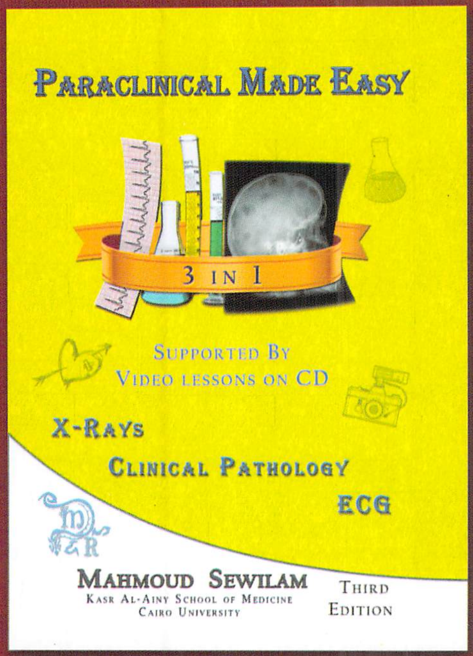
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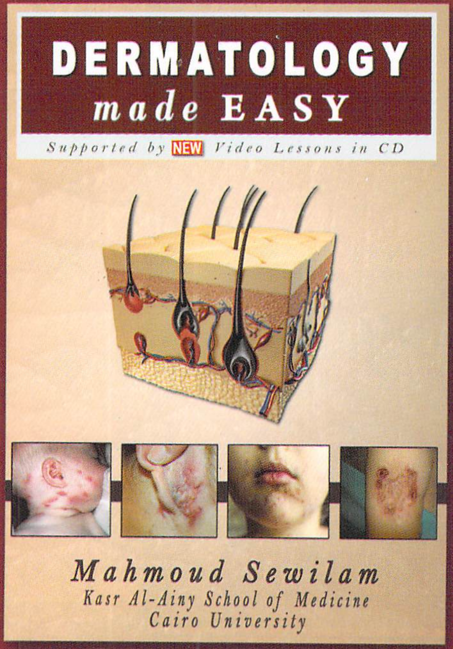
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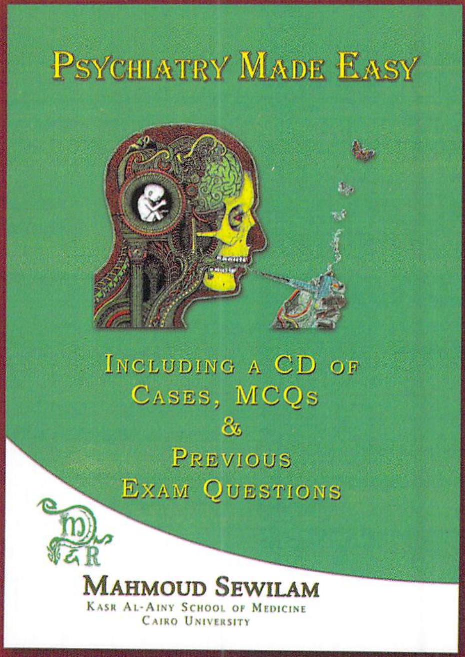
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